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ABSTRACT

This study was conducted to pre-validate the Motivated Strategies for Learning Questionnaire (MSLQ), the Learning and Study Skills Inventory (LASSI), and the Test of Reactions and Adaptations to College (TRAC) on a sample of students (N=103) from the population of psychology majors at Champlain Regional College, Saint Lawrence campus. The purpose of the pre-validation process was to provide information about student study skills and learning strategies for teachers to use during academic advising tasks; and to help teachers understand student performances, or non-performances, when students have the ability and resources. The report is organized into five chapters: (1) "Introduction" addresses developmental education; (2) "Instruments Field-tested" introduces and provides criteria for the selection and review of the three instruments; (3) "Psychometric Aspects of the MSLQ, LASSI, and TRAC on Saint Lawrence Students" provides information on the population, and the validity, reliability, and standardization of the three instruments; (4) "The Analysis of Student Performances with respect to Entry Level Study Skills and Learning Strategies"; and (5) "Conclusions" concludes that the academic advising effort in psychology courses should be directed at "test preparation," "self-efficacy for learning and performance," and "anxiety," and explores some implications for further research. Twenty-three tables are included. Contains 41 references. (LL)

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The Assessment of Student Study Skills and Learning Strategies to Prepare Teachers For Academic Advising Tasks

or

The Pre-Validation of Motivated Strategies for Learning Questionnaire (MSLQ), Learning And Study Strategies Inventory (LASSI) and Test of Reactions and Adaptation to College (TRAC)

by

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January, 1994

SUMMARY

The author has undertaken to pre-validate the Motivated Strategies for Learning Questionnaire ("MSLQ"), the Learning And Study Skills Inventory ("LASSI"), and the Test of Reactions and Adaptations to College ("TRAC") on a sample of 103 students from the population of Social Science, most specifically psychology, students at Champlain Saint Lawrence. The purpose of this pre-validation process is to provide information about student study skills and learning strategies for teachers' use during academic advising tasks.

The review of background information about validity and reliability are presented, for the uninitiated teachers, as a preliminary to the presentation of information about the validity and reliability of the MSLQ, LASSI and TRAC. In those cases where scales were retained validity and reliability were very high (99% to 99.9%).

The "self-efficacy for learning and performance", "test anxiety" and, to a lesser but important degree, the "self regulation" scales of the MSLQ; the "attitudes", "motivation", "anxiety", "time management", and "test strategies" scales of the LASSI; and the "failure anxiety", "attention problems in class", "seeking help from the professor", and to a lesser degree "effort regulation", and "attitudes about the importance of Cégep studies" scales from the TRAC were shown to be reliable and valid scales. The TRAC turned out, with 6 of its 9 scales, to be single most complete instrument.

Loglinear analyses were performed to test for significant interactions between categorical data and to check on the adequacy of the data/analysis model. The analyses of the three instruments, with final course grades in psychology as the dependent measure, reveals that "self-efficacy for learning" "est anxiety", "self-regulation", and "effort regulation", and possibly "time and study management" of the MSLQ; the "time and study management", "anxiety", and "concentration", and possibly the "motivation", "selecting main ideas and identifying important information", and the "test-taking strategies" of the LASSI; and, the "exam anxiety", "test-taking", "in-class attention", "help-seeking from the professor" of the TRAC are revealed to have a good model for regression effects on final course grades.

Anxiety, more specifically "exam" anxiety, is a variable common to <u>all</u> students. Next come the group of at-risk students (65% or less in the course). They are more likely to emphasize problems with "concentration /or attention in class", "meaningful and timely effort", and to a lesser, but still very important, degree

"time and study management principles" along with "making use of the professor as a resource".

Multiple regression analyses were performed on final course grade, as the dependent measure, and the valid and reliable MSLQ, LASSI and TRAC scales, based on loglinear results cited above, as the independent measures. The "self-efficacy for learning(MSLQ)", "test strategies and preparations(LASSI)", and the "test anxiety(MSLQ)" scores are very powerful (99.27% to 99.95%) predictors of student performances.

The theoretical work on "motivated cognitions" by Covington helps teachers to understand *why* students manifest false effort, i.e.: bickering about grades, unprepared office visits, incomplete assignments, lack of attention in class etc. The literature from the emerging field of developmental education establishes *when* and *how* teachers should intervene in students' self-defeating academic behavior. This report delimits the *what* of student study skills and learning strategies that appear to be must urgent for teachers to focus on.

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Dedication

I would like to take this opportunity to dedicate this work to all of the students who volunteered their time and effort so graciously. Nearly 90% of all the students enrolled in my Fall, 1993 classes responded with cooperation to my request to complete the three questionnaires. Without them, obviously, this report could never have been possible.

However, the choice to dedicate this to them, rather than simply to acknowledge their effort in the preface, the usual place for such amenities, resides in the fact that students responded with warmth, interest and especially with concern for the next cohort of students. This is an eloquent testimonial of support to one's peers and encouragement for this work.

Dear students, please accept this dedication with a heart felt "thanks!"

Preface

This work would not have been accomplished without the cooperation of several persons. Adrienne Hogue, of the Counselling Services, has provided information and documentation about the TRAC and shown interest in pursuing such work. Susie Ratté has tracked down and ordered references, as well as run DIALOG searches. I am indebted to Chris Vandenberg, my colleague in English, who has proofread the first draft of this report and made constructive suggestions. Paul Pintrich of NCRIPTAL and Claire Weinstein have provided extensive documentation, some still in press, on the MSLQ and LASSI, respectively. To all of you a sincere "thanks".

For stylistic purposes, the masculine gender is used throughout this text. It is understood, however, that it includes both sexes.

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Chapter 1: Introduction

Developmental Education

What is developmental education? How does it differ from remedial education?

According to Weinstein (1993, in preparation), developmental education is:

> A multidisciplinary endeavor in post-secondary education committed to promoting educational opportunity, academic skill development, and student success (National Association for Developmental Education, 1990; p.2).

Weinstein and Mayer (1986) have provided an excellent background document from which to glean the essence of developmental education. Essentially, developmental education is, in our interpretation, based on "...techniques that a learner can be taught to use during learning (p.315)". The emphasis is on task development.

> ..(T)he goal of any particular learning strategy may be to affect the learner's motivational or affective state, or the way in which the learner selects, acquires, organizes, or integrates new knowledge.
>
> ...The rationale is that good teaching includes teaching students how to learn, how to remember, how to think, and how to motivate themselves.
>
> ...Helping students to develop effective ways to handle the barrage of information coming from the environment, as well as their own thinking processes, is a major goal of our educational system...
>
> Teachers enter the classroom with two distinctly different kinds of goals (1)*Goals concerning the products of learning* which focus on what students should know or be able to do as a result of learning, that is, on teaching *what* to learn. ... (2) *Goals concerning the processes of learning* which focus on techniques and strategies students can use to accomplish learning, that is, on teaching *how* to learn. (p.315)

In remedial education the aim is to help students with material essential for further learning, but which they have not yet acquired. The important difference is that developmental education assumes that if one can intervene during the learning process one may be able to have students avoid remedial work. In all consideration the distinction between developmental and remedial education is blurred since the former includes addressing "requisite background knowledge" which is definitely in the domain of the latter. We share with Weinstein (1993, in preparation) that the focus of developmental education is on: "...classes designed to help students become more strategic learners who can take more responsibility for managing and self-regulating their own learning...(p.2)"

The nature of the task in developmental education is to assist students in taking an inventory of their skills and strategies and then adapting these to their current learning situation. A valid and reliable instrument to assess student study skills and learning strategies is required to accomplish the first part of this process. But will the development of students' study skills and learning strategies work? The current literature on academic motivation has several constructs which very well summarize the problem of students' active avoidance of developing study skills and learning strategies. Covington's "self-effort", Maehr's "willingness to invest", and Ridley's "reflective self-awareness" suggest that students do not become actively involved in the process of developmental education ---or so it appears. Thus it is critical, at this time, to examine how developmental education, by its emphasis on task development, could help us motivate students to become self-regulated learners.

The Need for Developmental Education

The need for developmental education is considered a part of the teaching/learning process. Thus any teacher and student are engaged in this process.

> ...(L)earning is viewed as an active process that occurs within the learner and which can be influenced by the learner. Instead of viewing the outcome of learning as depending mainly on what the teacher presents, the outcome of learning is supposed to depend jointly on what information is presented and how the learner processes that information (Weinstein and Mayer, 1986; p.316)

Introducing developmental education in the curriculum: Who benefits? What are the costs and risks? Who should be involved? Voluntary participation of students? These are some of the questions that come to mind once someone admits that asking students to be more responsible implies some responsibility for teachers to help them discover the strategies conducive to this goal. Obviously the students, especially the ego-oriented type, benefit in the context of the definition given for developmental education. Teachers also benefit because they help themselves move away from frustrating situations which are interpreted in terms of personal and/or social inadequacies.

The "costs" to students, if we believe achievement motivation theory are potentially high. High investments of effort risk leading students to realize that they must lack ability to explain eventual failures. For teachers it means reconsidering what, when and how information is presented and measured in the context of processes and strategies used by the students. In the quest to teach students learning strategies both teachers and students are involved. Whether the student participates is left to his or her choice. The evidence is coming in that participation in such learning activities helps students gain academically and to reduce stress and anxiety. In the closing comments by Weinstein (1993, in preparation) we find the gist for our 'pitch': "If a major goal of education is to produce life-long strategic learners then it is the responsibility of each instructor to teach students **how** to learn as well as **what** to learn. ... From a life-span perspective, learning how to learn is perhaps the most important outcome of a college education (p.15)"

This life-span mission must include the tools for teachers. Teachers must also find help in how to advise students and especially <u>what</u> to focus upon. This report hopes to fill this second need. In presenting these results we set criteria for a special characteristic for doing academic advising. We focus on practical behavior all teachers can call upon, and realistic, field-tested, suggestions as to how to do academic advising.

Student Motivation and Self-Regulated Learning

Dianne Bateman (1987) has provided this expert advice in "A Longitudinal Study of the Cognitive and Affective Development of Cégep Students":

> The ego development of incoming Cégep students was congruent with what would be expected of 16 and 17 year olds. The majority of students (67.2%) were at or below the Conformist Stage of ego development. This period is characterized by a great concern with appearance, material things, reputation, social acceptance and belonging. These concerns may translate into a greater importance being placed on social activities rather than on the academic responsibilities of college life. (p.43)

Are we then to imagine that our 17 and 18 year olds are motivated by hedonism or the pursuit of adolescent gratifications? After all, our Cégeps aren't advocating an educational vacuum in which students shelve their social and emotional needs in their lockers, as they pick up their books, to meet their cognitive needs. Cégeps spend much time and money on physical and human resources to promote a total quality of the educational environment. The range of physical activities and sports for collegiate, intra-mural and personal pleasure abound; the clubs, organizations and socio-cultural events (guest speakers, entertainers) etc. are promoted and coordinated by Social Animators to meet student social needs; there are a variety of discussion groups ranging from Bible Study to card games to meet the social and emotional needs of the clientele; and, there are excellent computer facilities, dedicated faculty, and support materials in the Resource Center to meet cognitive needs.

In effect, we are not trying to explain the behavior of all, or even of most, students who fail or abandon courses. Fourteen years of Cégep research on this topic have shown that there are many contributing factors (Québec, 1993). Our concern is simply to be certain that students understand and are encouraged to use the strategies that are deemed necessary to acquire or "learn" the materials in our courses.

The cramming, procrastination, the excuses and, ultimately, the frustration that students express does not concord with a pure hedonistic position. Students genuinely seem interested in the pursuit of higher education. Students are all very conscious of the fact that parental approval, peer acceptance and jobs are at stake. I believe we do see them make an effort but they seem to lose heart so quickly which sets into place a domino chain reaction in which one poor academic result seems to paralyse their self-worth and their ability to invest further in the academic tasks that remain.

Perhaps, as Bateman (1989) suggests, there is a gap between the teachers' and the students' expectations, a gap which is reduced as the students mature or move ahead in their development from late adolescence to early adult. These goals are incidental to the primary mission of Cégep which is to define and promote educational needs. In this respect, faculty have learned that students learn from teachers they like; who show interest in them and in their development; who are easily available for help; and, who encourage them to support what is essentially the lonely task of studying. But then why won't students attend the many workshops, quiz preparations and reviews, study skill conferences and seminars etc. unless they are compelled? Part of the answer, as Bateman suggests, resides in the nature of the student in relation to the perceived task and how the results of performance on these tasks define self-worth.

Covington (1983) has described the students' awareness of this process as "motivated cognitions". "I employ the phrase *motivated cognitions* to refer to this complex interplay in which cognition is at once the servant of motives, ..., and also the planner and clarifier (p.140)". The "complex interplay" relationship between the student-as-server and student-as-served has been succinctly summarized by Covington (1984), in refining this theory :

> The evidence suggests that individuals strive to maintain both private and public images that are not only internally consistent with one another, but also credible in the eyes of others (p.80) ...
>
> ...(I)t is understandable that efforts to protect a sense of ability are a major preoccupation among students. Pupils of all ages, from kindergarten to college, value ability ..., and, particularly among older students, prefer to be seen by others as achieving by means of ability rather than by dint of personal effort...(pp.81-82) ...
>
> Obviously, the most direct way to avoid school failure is simply not to participate. This time-honored strategy with its many variations is well-known to teachers: appearing eager to answer a question, gambling that the teacher will call on someone else who appears less certain; busily taking notes, hopefully too busy for the teacher to interrupt; or slouching, down in one's seat to avoid notice. Other manifestations of this strategy are an unwillingness to do work that is not absolutely required or doing as little as possible on required assignments, and in its most extreme forms,

> absenteeism and chronic inattention. Naturally, noninvolvement is not without risk, because teachers expect students to try and teachers reward and punish students accordingly. For this reason, nonparticipation tactics are often combined with other ploys, such as false effort. (p.83) ...
>
> By handicapping themselves through the tactic of studying only at the last minute, procrastinators can hardly be blamed for failure, and if they succeed these persons will appear highly able because they achieved with so little effort ... (p.83)

Covington (1983) has clearly described the dilemma the student faces by introducing the construct of " double-edged sword":

> A given cause of failure (e.g. low ability) is discounted and left vague and uncertain if other more plausible reasons (e.g. low effort) are available. However, the realities of classroom life make untenable such crude and obvious tactics as simply not trying. Teachers value effort; they reward success and punish failure less when the student has tried hard ... Thus many students must thread their way between the threatening extremes of high effort and no effort at all. It is for this reason that effort has been characterized as a 'double-edged sword'. (p.147)

The conclusion is simple: "Try, or at least appear to try, but not too energetically and with excuses always handy! (p.149)" . Helping students learn to manage their cognitive resources and to better allocate effort thus become essential aspects of task development. This is how developmental education, by its insistence on task development, and motivation when it helps students accomplish this goal, interface.

Covington's theory circumspects our teaching and learning realities very well. But how, specifically, are teachers to intervene?

In a series of articles Covington and Omelich (1979a,1979b,1981,1984) and culminating in an article whose very title is revealing, "Ability and Effort Valuation Among Failure-Avoiding and Failure-Accepting Students" (1985), have shown beyond any reasonable doubt why students are indeed motivated to stay in an environment that generates shame, doubt, guilt, humiliation and anxiety for them.

> ...these data also suggest that the failure reactions of low self-concept individuals depend on their certainty about this low ability status. This differentiation of failure orientation into failure avoidance and failure acceptance lends plausibility to previous speculations that sustained achievement striving is more likely among individuals who are still uncertain about their negative self-image because they are seeking out successes to redress this uncertainty in a positive direction ..(p.457).

It remained for another researcher, whose career has focused on the role of task and ability in academic achievement, to explain why ego-oriented and not task - oriented students are prey to such motivated cognitions.

> Thus, I use the term *task-involvement* to refer to states where our concern is to develop or demonstrate (primarily to oneself) high ability in the less differentiated sense. *Ego-involvement* refers to states where our concern is with developing or demonstrating (to self or others) high rather than low capacity (Nicholls, 1984; p.43) ...
>
> Learning will, therefore, be more likely to be experienced as a means to an end when we are ego-involved. It follows that when we are task-involved, we will attempt to learn if we see an opportunity to do so and, when doing so, will feel we are doing what we want to do. Our learning will be endogenously attributed (Kruglanski,1975). We will feel we are learning freely. When ego-involved, on the other hand, we will feel more constrained. Our learning will be more exogenously attributed and we will not attempt to learn if this appears unlikely to enable us to demonstrate high capacity. (Nicholls, 1984; p.43)

Thus, a series of teaching and learning experiences that emphasize and promote task-orientation rather than ego-orientation are necessary. In this context, we now turn our attention to identifying such needs within the framework of development education.

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Teaching and Learning Study Skills and Strategies

According to learning skills' theorists, counsellors and textbook writers on the topic, the characteristics of students as learners, in terms of what they do during the learning process, must include: Attitudes and motivations for studying and attending Cégep; anxieties and stress induced by evaluation, performance and learning; cognitive strategies which include concentration, attention, monitoring and information processing, selecting main ideas, rehearsal, elaboration and organization; effort regulation and beliefs about one's abilities; and, of course, time management and study aids.

The instruments being field-tested here are the results of expert refinements in the field and with populations of college or university students. The LASSI has the longest and widest acceptability; the MLSQ does the most complete job of addressing most of these concerns in specific scales; and, the TRAC, the most recent has undergone two revisions and has the advantage of being drawn on a population of Cégep students. No one instrument does an assessment of all of these areas.

Teachers should identify and be prepared to explain to students the *essential* strategies. And, as we will see in the following section, the first effort must be to get the student to commit himself or herself to a real effort. This means emphasizing the process (strategies and learning new skills) more than the goal (passing grades). It does mean that if students don't have basic learning strategies then effort must address time-on-task and task development rather than concentrating on exceptional efforts (i.e. "cramming"). This moves students from working harder to working smarter!

So, when students complain teachers owe it to them to be sure that students have at least a fair knowledge of the cognitive skills teachers expect of them to learn the material. Keeping to several essential points, especially from a student's perspective, is important because, as the literature on academic achievement motivation suggests, students' perceptions of task difficulty have an important effect on attributions of effort. And, as we know, our students are easily overwhelmed by our "demands" for them to learn. By focusing on acquiring and/or developing a few central strategies at a time, students could improve enough to want to learn still other strategies. And, as we establish in Chapter 4, these areas have been identified as self-efficacy for learning, test preparation and

anxiety (for learning, performance and evaluation).

There are excellent and practical suggestions made -in French- in the TRAC manual, in Johnson et al. (1991) and Cross and Angelo (1988) to assist teachers in these tasks. Section 5 of the TRAC User's Guide (Larose, Roy and Falardeau, 1991; pages 36-50) clearly states the relationship of the TRAC, the nature of the student-teacher relationship, and the student's integration into college life.

> This section contains a series of cognitive, affective and behavioral intervention strategies that all teachers, especially those of first year students, should consider in their student-teacher relationships. ...
>
> This section may be used in a variety of ways. It may serve as a model for all teachers, especially for those teachers who work with "at-risk" students; it can provide a framework for the teacher's suggestions and recommendations to the student; it can act as the starting point in planning where change is most needed, according to student profiles; it can increase teacher's awareness as to the behavior and attitudes that will help students make it through Cégep. (Translated and adapted from Larose, Roy and Falardeau, 1991; p.36)

For example, "paying attention in class", which seems to be a common and important one, from the student's perspective, is treated this way in the TRAC:

> Objective: (Adapted and translated from Larose, Roy, Falardeau, 1991; pages 43-44)
>
> 1) Getting students to maintain in-class attention and time-on-task.
>
> Professor-Class Interventions:
>
> 1) Use several minutes at the beginning of class to do breathing exercises that promote relaxation. These have been shown to have a beneficial effect on attention and concentration.
> 2) Invite the distracted students to sit in the "best" places (front and center).
> 3) Avoid asking for the same repetitive acts over prolonged periods of time.
> 4) Regularly draw students' attention by asking questions, asking them to reflect on what has been said etc.

5) Teach students how to use self-talk to control their attention span and develop an attitude that increasing attention spans is beneficial
6) Actively encourage students to take lecture notes.
7) Insist on assigned readings as preparation for the class lectures.
8) End the class, or begin the next one, by revising what has been presented.
9) Provide verbal cues, with inflections, intonations etc. to indicate the relative importance of some words or topics etc. (This also suggests that varying your vocalizations has beneficial effects on retaining attention.)

Professor-Student Interventions:

1) Help the student define and set realistic short-term goals
2) Teach the student "thought-stopping" techniques. (These techniques require students to write down what they are thinking at any given time -usually when directed by the teacher. The contents of these notes helps the student to see how outside interferences -emotional concerns, fantasizing etc. have negative impacts on attention since we cannot actively process two different messages at the same time. See your local psychology instructor for demonstrations.)
3) Suggest that the student experiment with different learning climates. Oftentimes the learning climates are related to sources of distraction which influence attention.
4) Work through out loud a problem yourself. Explain to the student what you are thinking and doing at each step. (You may not have the words to express correctly the process which you are able to use. Consult an Introductory Psychology textbook on the topic of "problem-solving", or see your local psychology instructor.)
5) Explain and demonstrate how the student may deal with distractions in class or while doing homework. (Resource or Learning Centers, or Libraries usually have kits on 'how to take lecture notes', 'how to prepare research papers' etc.. The better ones provide audiocassettes and manuals that students can use for practice.)

The National Center for Research to Improve Postsecondary Teaching and Learning ("NCRIPTAL"), at The University of Michigan at Ann Arbor, has produced excellent pedagogical materials over the past decade. Johnson et al. (1991) have listed practical and behavioral oriented suggestions for teachers to use

to help students with motivation, cognitive and metacognitive as well as resource management problems. It is rather unusual to quote a Table of Contents but in this case it is the single best quotation to support the claim that teachers who want "hands on" materials with realistic Tips for "What," "How," and "Why" to intervene with students would do well to consult.

Table of Contents (Johnson et al. 1991)

Acknowledgements
Introduction

PART A: MOTIVATION SCALES OF THE MSLQ
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2A. Time and Study Management
2B. Effort Management
2C. Peer Learning
2D. Help-Seeking Behavior

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Perhaps the most beneficial reference, in the context of the discussion to help students *develop* self-regulated effort, is the section "Techniques for Assessing Students' Self-Awareness as Learners and Self-Assessments of Learning Skills," from the work by Cross and Angelo (1988). Again, the Table of Contents for that section is most informative:

CONTENTS (Abridged from Cross and Angelo; 1988, p. vii)

II.Techniques for Assessing Students' Self-Awareness as Learners and Self-Assessments of Learning Skills

Assessing Students' Self-Awareness as Learners

15. Student Goals Ranking
16. Course-Related Interest and Skills Checklist
17. Focused Autobiographical Sketches of Students as Learners
18. Dual-Viewpoint Skills Portraits

Assessing Students' Self-Assessments of Learning Skills

19. Self-Studies of Engaged Learning Time
20. Punctuated Lectures: Listen, Stop, Reflect, Write, and Give Feedback
21. Self-Diagnostic Learning Logs

All suggestions mutually benefit teachers and students.The sub-section "16.Course-Related Interest and Skills Checklist," is an example.

> DESCRIPTION:
> ...Teachers create checklists of topics covered in their courses and skills strengthened by or required for succeeding in those courses. Students rate their interest in the various topics and assess their level of skill or knowledge by circling the appropriate responses on the checklist. ...
>
> PURPOSE:
> ...With such information, teachers can better plan and adjust their teaching agendas. They can plan how best to approach topics about which students indicated particularly high or low interest. They can also adjust their syllabi to take into account students' self-assessed skills and knowledge levels. (Cross and Angelo; 1988, p.94)

This section of the report has focused on teaching and learning strategies for the general population of students. However, we need now to turn our attention to explaining how to plan and then intervene with ego-oriented students who are quite different in how they use self-regulated effort.

Developmental Education, Student Motivation and Learning to Learn

Our purpose is to help students assess their study skills and learning strategies before they get into academic difficulties. Of course time is necessary to learn these new skills and strategies. This implies taking a reduced course load determined by the student's particular situation. Advising students of the probability of success in relation to their level of current study skills and learning strategies is a cognitive strategy.

Sainte-Foy Cégep currently builds a predictor model based on students' TRAC scores, program of study and sex. Students who manifest certain psychometric patterns for given programs are encouraged to take reduced course loads. Teachers are given clearly defined behavioral objectives to help integrate student efforts at removing deficiencies or acquiring study skills and learning strategies. For example, two types of professor interventions are suggested: "professor and class," and "professor-student". Pages 41 and 42 from the TRAC manual which address "Seeking help from the professor" are presented as follows:

> Objectives: (Translated and adapted from: Larose and Roy, 1991; p. 41)
>
> 1) encouraging students who need help to contact the professor;
> 2) encouraging students to ask professors for additional explanations;
> 3) encouraging students to feel free to ask questions in class;
> 4) encouraging students to visit the professor for additional help.
>
> Professor-Class Interventions: (Translated and adapted from: Larose and Roy, 1991; p. 41)
>
> 1) Present yourself as a sociable and agreeable person that students will want to get to know
> 2) Actively encourage student to seek your help in class and outside of class.
> 3) Let students know that you encourage and appreciate in-class participation. Be sure to reflect the attitude that asking questions is a

sign of intelligence.
4) Provide an easily visible and readable schedule of office hours.
5) Don't criticize a student in front of his peers.
6) Make yourself available a few minutes before and after class to encourage the student, who would not otherwise ask questions during class, to see you.

Professor-Student Interventions: (Translated and adapted from: Larose and Roy, 1991; page 42)

1) Encourage, even insist, that each student meet with you early during the term. This helps break down and psychological barriers which contribute to students not seeing you at all.
2) Remember that office visits for students are to be opportunities for interpersonal exchanges.
3) Encourage the student to take interpersonal risks. After all, knowing about risks, when to take them etc. are the basis for affirming oneself.
4) Encourage the student to explore with you the pros and cons he faces in taking risks.
5) Discuss with students the pros and cons of extra-curricular activities.

The TRAC manual lists many other practical suggestions for the attitudes and behavior that teachers may plan into their classes and student-teacher contacts to foster in students the important initial step -real effort. Please note: there is only a French language version of the TRAC manual and user's guide.

St-Lambert offers formal, structured peer tutoring activities. There are a variety of intervention strategies to respect specific student and institutional needs. Some are based on specialized professional counselors, learning centers, teacher-run workshops etc. The key at St-Lambert is that students keep a journal of activities which become the focal point of discussions. In this context student "success" is discussed in terms of involvement with the task. And, as we discussed, in the context of Covington's theory, helping students focus on time-on-task, rather than being concerned with normative comparisons, leads to real rather than "false" effort.

This construct of "real effort" is a nagging one. In an effort to cut through much

theoretical discussion and still more constructs, we call upon Virginia Valian's (1977) work "Learning to Work". In this exciting essay Ms. Valian, today a University professor of psychology, describes how she lived through and converted herself from being ego-oriented to being task-involved.

> The problem consists in being unable to work, not because of external pressures such as lack of time, but because of internal problems, which can be exacerbated or disguised by external pressures. (p.164) ... ...
>
> I continued the analogy (that work was natural) and decided I needed a similar form of therapy. I needed to break the process down, starting at the least threatening level, slowly building up and assembling the whole, and discussing how I felt and what I was learning as I was doing it. ... The common feature was starting with a small, imaginable, doable piece of behavior and working up; the crucial difference was the absence in my program of any idea of punishment or reward. (p.165) ... ...

The key concepts Valian invokes are that the student must determine what is a realistic goal for him or her. In Valian's case the idea of doing a "days work" was to agree to try a fifteen minutes work period. She reports having been able to do only 5 minutes at it during her first attempts! Gradually, she worked her way into a 15 minutes work schedule. As she reports, her college work consisted in doing "enough to get by"!

Her story closely parallels the constructs of "shaping, or successive approximations" in instrumental conditioning. From the judicious use of self-paced shaping, the guilt for not trying /or the humiliation for failure after trying led her to these insights:

> 1. The first rule was that the fifteen-minute period had to be spent solely in working. ... What I learned, though, was that I could deal with problems and didn't have to give up whenever I encountered them. (Valian, p.167)

Thus, by focusing on one of the student's study skills and learning strategy deficiencies, which he or she has chosen, the student becomes an active decision-maker. The authority (making decisions) cannot be separated from the responsibility (consequences of change) and then to expect student "self"-regulated learning.

> 2. The second rule was that official increases in the amount of working time were limited to one fifteen-minute chunk at a time, with a break of any length available after every chunk. ... I didn't have to make a rule about working twenty minutes straight, then twenty-five, and so on, because I was sure ahead of time that I wouldn't be able to do it. But I could imagine myself working four fifteen-minute chunks during the day. I was cautious: I disallowed increasing work by more than one chunk at a time because I wanted to make sure I was really comfortable at a given level before going on to another. (Valian, pp.167-168)

It is very important to note at this time that Ms Valian did not want to increase but rather to maintain her time-on-task. Many persons who are task-oriented also manifest ambition (i.e. high levels of "need achievement"). This ambition translates into motivation to do more and to do it more often. This process appears to demotivate students whose efforts are perceived as threats to their self-worth. By increasing the demands for time-on-task the student is assuredly working towards perceived personal failure. Thus, it appears important that, as Valian, has shown, students set a very realistic standard of quality time-on-task and that they increase the frequency of these intervals rather than increasing the interval itself. Note also that the student must become acclimated at a block of time/work before adding more blocks of time for work. These principles of systematic desensitization have been field proven since they were first introduced by Joseph Wolpe in 1961.

> 3. The third rule -in some ways the most important one for me- was to work every day. .... no excuse could rule out fifteen minutes. (Valian, p.168)

When time-on-task is at a low-level cognitive demand, set by the individual student, the rationalizations and cognitive/affective dissonances for not keeping to "one's shoulder" to the task are untenable. If you will recall one of Leon Festinger's classic Cognitive Dissonance theory experiments (Festinger and Carlsmith, 1959) predicts that when a person is made to act in ways inconsistent with initial attitudes for a low reward it is quite likely that the person will change his or her initial attitudes to be in accord with the behavior. This means that we can be made to change the affective and cognitive aspects of attitudes. The effect is strongest when the individual has made a public, rather than a private exhibition, of the contradiction between the observed initial attitudes and the incongruent behavior. The student and the teacher define, at least minimally, the student's

"public" manifestation of initial attitudes towards effort and behavior (brief attempts at studying or other academic tasks). The key is to practice with the student during an office visit to make sure that he or she has the basic skills to perform the task. Then asking the student to do one more, under the teacher's supervision to finally ask the student to do one alone as preparation for the next office visit. According to the theory the student will have to change his or her mind about effort regulation since there is no ostentatious reward or punishment for not complying.

> 4. The fourth rule was to ignore thoughts about the end product and how the end product would be received. ...I refused to dwell on actually finishing my work and concentrated on doing it. (Valian, p.168)

Accomplishing this, as has been suggested in the comments made about the last step, requires teachers to become involved in a non-evaluative fashion with the student as the student attempts to do an academic task. A supportive attitude ("I'd like to help." "I know I can help you.") with facilitative statements ("Let's go back to the directions. Re-read them out loud. What words are telling you what actions you should do?") on the part of the teacher while focusing attention on the demands of the immediate problem will meet the requirements of this fourth step. This helps students to re-define self-worth in terms of behavior rather than in terms of dichotomistic thinking ("You are or you aren't born intelligent"!)

Ms. Valian offers these keen insights into self-worth in relation to ability and effort:

> The problem is not with competition and feeling competitive, but with the interpretation and generalization of winning and losing. Feeling good about winning is fine, as long as what you feel good about is limited to what you *did* and does not involve an estimation of your worth as a person. Feeling bad about losing is perhaps all right if you could have done better and your feeling bad is limited to that and, again, does not involve a judgment about your worth as a person. (pp.170-171) ...
>
> It never occurred to me that I could be like others in some ways and unique in other ways. ... Once I recognized that the conflict between being myself and being like others was largely of my own construction. It stopped being much of a problem. ...

> There is a pinch of rational objection here, which is that people's value as people should not be judged by the quality of their work. In particular, I don't want to earn others' love by a display of my professional abilities. Yet there is an irrational edge to the resentment, for the real problem was that emotionally I accepted that form of judgment and valued others less because their professional abilities were slight. (pp.171-172) ...
>
> My preoccupation with my ability seemed to imply a need to be perfect, which is both a sign of arrogance and of weakness. It says, in effect, "I am so smart I can demand perfection of myself, something impossible for lesser mortals." But it also says, "I have so little confidence in my personal worth that professional imperfection is symbolic of personal unworthiness." The only escape from the two extremes is to put the question of ability in its proper place, which is, I think, no place at all. Ability is not important. (p.172)

The tone of this paper, so far, may have suggested that teachers are not engaging in teaching learning strategies. The opposite is most likely the case. There are many teachers giving generously of their time to students in private office visits, running non-credit seminars, workshops etc. The problem is not, I believe, in insisting that teachers do it, because teachers are doing it. However a concerted effort seems to be required in identifying and orchestrating what strategy or strategies would most efficient for students' needs. By working as a team on the same set of measures we are likely to reinforce time-on-task which, as has been suggested, is an excellent means of dealing with "false effort".

Sometimes we get the impression that students and teachers are in an adversarial system where teachers dole out the precious little grades which have come to mean too many things for students, parents, administrators etc. To avoid normative appeals teacher emphasis on self-efficacy, test preparation and dealing with anxiety are likely to "...deliberately provide students with teaching practices that support yet challenge their current ways of thinking and beliefs (Bateman, 1989; p.93)."

Teachers insist on grades as a representation of ability and cooperate fully with students to support student effort. We should be very careful with student effort to emphasize change rather than ability. Thus student effort could be isolated from their ability. As Covington and Omelich (1979a) state: " ... self-structuring places a premium on self-management skills, and it is the students low in self-concept of

ability who are least able to manage their own learning. ...Overall, this procedure has the effect of redefining success in terms of exceeding one's own standards rather than surpassing the accomplishments of others (p.179)."

However, developmental education does not mean we have the right to impose upon individual liberties and freedom to choose. After all, students are free to choose to fail, or to refuse teacher offers for help etc. In this context we turn our attention to defining the personal limits for choice and change.

Choice, change and change agents

The scientific literature has long debated the concerns of academic achievement motivation. The focus has been on students' conceptions of ability, the motives for self-worth, and of personal investment. This means that:

1) tasks are clearly defined and understood by students. Otherwise the discussion about difficult versus easy tasks becomes confounded;

2) skills or abilities required to accomplish these tasks must be defined and assessed. Also the student chooses a) on what to begin working, b) with how much initial effort, and c) the incremental blocks of efforts. Otherwise students increase effort without necessarily increasing ability. That is, in the words of Weinstein, students "word harder but not smarter!"

3) self-worth is a function of how well one uses what one thinks one has. If this is true, changes in self-worth ought to be reflected to the degree that one perceives positive changes in what one does rather than what one has (ability). This is precisely the goal-state we are working for in student self-regulated behavior.

This process requires that teachers provide non-threatening evaluations and feedback, and opportunities for students to develop appropriate study skills and learning strategies. There is no choice to give or not to give the information. The choice to act belongs to the student. If we are to respect our roles as professional teachers then we must inform students and provide the necessary advice and strategies for them to change.

The essence of evaluating and providing feedback in a non-threatening way about student study skills and learning strategy abilities is to show students that: (1) the threat is serious, (2) they are vulnerable, (3) they can learn to do something about this threat, and (4) we can and will teach them, at a pace and in blocks they choose, the strategies they need in step 3. The specific behavioral and cognitive attitudes for teachers to adopt have been presented earlier in the discussion of the TRAC in the section Developmental Education, Student Motivation and Learning to Learn.

Although all students can be expected to benefit from such an approach, not all students can be expected to participate. Some students are caught up in gratifying adolescent needs and new-found freedoms, others clearly lack ability, while some have personal and family problems that limit the amounts of energy they may call up; and, some have much too heavy "part-time" work loads. Such students need to be referred to the Counselling Services.

Teachers also benefit. It is a tiring and frustrating experience to listen to students bicker about grades, come for office visits unprepared, ask for delays on assignments that they have had for several weeks etc. By focusing on helping students to change teachers are perceived as interested in students and in the quality of teaching and learning. Furthermore, teachers will find that they will eventually attract this clientele. The TRAC manual (Section 3: Les Profils de Réussite; i.e. "Profiles of Successful Students") reveals that having recourse to the teacher for explanations and help consistently ranks amongst the top three, along with "priorities for a college education," and "paying attention in class."

The changes in student attitudes, participation and "learning" are additional benefits of mutual interest to students and teachers. Table 9, next page, from the TRAC, reproduced below, shows this eventuality quite well. Students have high priorities for a college education, excel in test preparation, and manifest excellent skills in meeting short-term goals. That is, this last point suggests that students focus on the immediate demands (task orientation) rather than on the distant future (final grades). Such results are in keeping with the theoretical positions of Covington and the practical applications made by Valian: Consistent, short-term actions while being actively involved with time-on-task produce learning and grades.

"Table 9: Corrélations entre les facteurs du TRAC et la perception de l'enseignant (n=66)" ("Correlations between TRAC scales and the teacher's perception (of the student)".) (TRAC manual, p.23)

Teacher's Perceptions:	TRAC Scales								
	RA	AE	PE	QA	RP	E	CF	CM	PAE
The student makes proper attributions			28*	18					24*
The student is actively involved in learning			24*	18		21*			38*
The student sets short-term goals		-32**	21*	33*	22*	22*			33**

*=0.05 and **=0.01 (i.e 95% and 99% certainty, repsectively that this was not due to chance events)

RA=Exam anxiety; AE=Failure anxiety; PE=Test preparation; QA=Attention in class; RP=Seeking help from the professor; E=Peer learning; CF=Effort regulation; CM=Attitudes towards study skills and work habits; and PAE=Importance of college studies.

Chapter 2: Instruments Field-Tested

Introduction and Criteria for the Selection and Review of Instruments

This chapter presents an overview of the Motivated Strategies for Learning Questionnaire (MSLQ), Learning And Study Strategies Inventory (LASSI), and the Test of Reactions and Adaptation to College (TRAC).

The criteria used to retain the instruments were: a comprehensive, reliable and valid instrument for diagnostic purposes; the similarity between our students and the population of students used to validate the instrument; and practical suggestions for planning intervention strategies. This last point implies a cognitive framework for instruments that emphasize such skills can be taught and learned.

We include information about the institution, types of students, programs of study on which each instrument has been field tested. Certainly, we review the purposes for which each instrument was developed.

Finally in the separate section titled: "Scale Construction of the MSLQ, LASSI and TRAC" we examine the constructs and the operational definitions used to make up the scales.

The Motivated Strategies for Learning Questionnaire (MSLQ)

Wilbert McKeachie, an authority on teaching and learning at Michigan State University, laid the foundations for what was to become the National Center for Research to Improve Postsecondary Teaching and Learning (NCRIPTAL). Paul Pintrich has been the architect in this development.

The 81 questions, distributed over 15 scales, of the MSLQ appear as an outgrowth of a course (teaching learning to learn) for "at-risk" students at The University of Michigan. These students have been described as minorities, some athletes with language skill deficiencies, and those with lower than average UM Scholastic Aptitude Tests (SAT's) scores (1010 versus 1150).

> Our course, entitled, Learning to Learn, is an introductory psychology course geared to freshmen at The University of Michigan. In devising it we were particularly concerned about three groups of students: (a) anxious students, (b) minority students, and (c) student athletes. ...many of the problems of test-anxious students are due to poor information processing strategies. ...their study habits emphasize excessive use of repetition and rote memorization rather than more effective learning strategies. ... Athletes are recruited to Michigan and promised a college education in exchange for their athletic performance. Many of these athletes lack the academic skills needed to succeed in college. (McKeachie,Pintrich and Lin, 1985; p.156)

Of course, not everyone does well in such a course. McKeachie et al (1985) explain the performances, or non-performances, of "D" and "F" students this way:

> Students who obtained poor grades in our Learning to Learn class typically came to class infrequently or simply lacked the basic skills needed to read and understand the textbook and lectures. Because they lacked the basic reading and writing skills needed as a base for developing the strategies we taught, they could not benefit from the class. For these students, doing poorly in a Learning to Learn class may be a confirmation of fears about low ability, which leads to less effortful behavior and poor attendance. ... It appears that a minimum level of basic skill is required to be successful in a learning strategy training program (p.158)

Anyone who has taught in (our) Cégep has been faced with such students. As these authors put it: "Learning strategy research needs to address the problem of matching training to the needs of students with poor basic skills (p.158)."

The MSLQ appears to be an important in-house instrument with strong potential for research purposes. It has not been developed and standardized on a wide-scale basis and used in a variety of institutions. However, reports of validity and reliability are good. The MSLQ insists in helping students take charge of their education through a cognitive framework which stresses more adequate general information processing capabilities by removing individual inadequacies. However, as these authors recognized, a standard of minimal competency is required to understand and follow these directions. In this respect, the MSLQ may appear better suited to work with students who show some signs of adapting and responding in a learning to learn course.

The MSLQ manual as well as some excellent documentation and practical suggestions for helping such students are available from NCRIPTAL. Some materials are free of charge while others have nominal fees. For information write to:

National Center for Research to Improve
Postsecondary Teaching and Learning (NCRIPTAL)
Suite 2400 School of Education
The University of Michigan
Ann Arbor, Michigan 48109-1259

(313) 936-2741

The Learning And Study Strategies Inventory (LASSI)

The 77 item, 10-scale Learning And Study Strategies Inventory (LASSI) (Weinstein, Palmer and Schulte, 1987) reports on students' attitudes, motivation, anxiety, self-management and cognitive learning strategies.

According to the publicity provided by the publisher, 1,063 institutions of higher education use the LASSI or the electronic version ("E-LASSI"). All types of community colleges, four year colleges and major universities report using LASSI or E-LASSI for advising, counselling, and developmental education. As Weinstein (1992) reports: "...more than 1000 training institutes, colleges and universities here in the states..." are using the LASSI. The list includes hospitals, high schools, some government agencies and school boards, adult education and even several medical schools. Canadian institutions are represented and range from universities to colleges. That John Abbott College, here in Québec, is included is particularly important since the clientele and programs of study are part of our Cégep system.

The stated purpose of the LASSI is to provide:

"A basis for improving all student's learning and study strategies;

A diagnostic measure to help identify areas in which students could benefit most from educational interventions;

A counselling tool for college orientation programs, developmental education programs, learning assistance programs, and learning centers;

A pre-post achievement measure for students participating in programs or courses on learning strategies and study skills;

An evaluation tool to assess the degree of success of intervention program or courses." (Weinstein,1988)

The rapid and widespread adoption of this instrument and the testimonials suggest it is popular. The report of the validity, reliability and norms are in keeping with sound psychometric principles which are examined in a later chapter.

The LASSI booklets are available at nominal cost, with discounts for quantity purchases, and allow students to score their own reports. Adminstration varies from 15 to 30 minutes depending on individual student reading comprehension and practice with such tests. An electronic version (AppleII or IBM) is available for group administration and scoring. "A free specimen set of five administrations of the E-LASSI is available."

The agent, publisher and distributor is:

H&H Publishing Company, Inc.
1231 Kapp Drive
Clearwater, Florida 34625

(813) 442-7760.

Of the three instruments field tested the students felt the LASSI was the easiest. Students reported the face validity to be broader than the TRAC (many students noticed the heavy reliance on anxiety measures in the TRAC), the question stems were easier to process than in the MSLQ, and the 5 item answer choice rather than the 7-item choices in the MSLQ and TRAC made it easier (quicker?) for students to discriminate.

The LASSI makes important contributions to the diagnosis of at-risk students. It does not have to single them out for special testing which often only stigmatizes

such students who are too ego-oriented already. The fact that it is being used in training institutes and (community) colleges suggests it deals with entry-level problems with average high school graduates. Students who are considered "at-risk" at The University of Michigan are still likely to be superior in their skills compared to the at-risk students in our Colleges. The population of students used tos tudy the Lassi are more similar to our College students. This makes it easier and more credible to generalize Lassi results back to our College students.

The Test of Reactions and Adaptation to College (TRAC)

The Test of Reactions and Adaptation to College ("TRAC") (French language versions) is an outgrowth of attempts to find leading indicators of differences between successful versus unsuccessful Cégep students, especially during their first session of study. As Larose and Roy (1991) report the failure rate has gone from 18% in 1980 to a projected 33% for the 1990's. That's also pretty much the situation at St-Lawrence. These authors were concerned that once a series of failures were experienced a vicious self-fulfilling circle, fuelled by faulty cognitions, attributions, and motivations, would reinforce the student in his belief that he lacked ability.

Of the 60 items on the TRAC, 27 deal with anxiety. As we see in Table 1 the TRAC is similar to the LASSI with the exception that some items are very narrowly defined. For example, Help seeking refers to students' attempts to seek help from their teachers. I question the validity of such a set of questions when one of the major complaints of students attending a large Cégep is precisely the difficulty one has in contacting and then meeting with the teachers. It could very well be that Cégep Sainte-Foy has no such difficulties. After all, the instrument was specifically designed for in-house use.

Another special series of questions assess the student's ability to affirm himself and peer learning. Again, the committee charged with operationalizing the "at-risk" group at Sainte-Foy discovered this to be true of their student population. This seems reasonable when one's primary concern is working with one's own student population. We should expect then that some of these scales would be very significant or not significant at all at St-Lawrence. For example, the scale which measures the student's seeking help from professors is particularly true since the policy here is for teachers to be readily available for students. The scores on the

two anxiety scales will prove worthwhile in that a wealth of information should be provided on those cases of students who are anxious.

The psychometric results of the TRAC, to be discussed in a later chapter, range from good to excellent. More about this in the chapter dealing with the psychometric properties of these instruments.

Results are based on students from a variety of technical and pre-university programs. The aim is to produce a regression of TRAC scores on achievement. Students, by program and sex, are advised of the probabilities associated with taking and passing courses based on the scores. The intent is early diagnosis and reduced course loads, referral to remedial help or developmental education courses. A profile of successful versus unsuccessful students is offered in a separate part of the manual. Although the results are encouraging, they are tentative. The order of importance in predicting achievement is: test preparation, attention, expectations for failure, task value or attitude towards learning in Cégep, and seeking help from the professor. An important variable at Cégep Sainte-Foy is the sex of the student. Five of the 8 programs show a sex differentiated bias in scores. That is, scores for females on certain scales, and for some programs, leads to different suggestions than those made to males with similar scores in the same program. For example, female students in other than math-oriented programs (Pure & Applied or Health Sciences for example) who must take a math course as part of their program have much higher levels of anxiety, and lower expectations for success, than males. That is, these females appear more prone to "math phobia" than males in the same program.

Before we can attain the level of making our norms and talking about predicting based on sex and program of study we will need to field test the instrument retained or derived on the whole cohort of students entering each Fall session. Even then there may not be enough of these students in any one program and/or by sex to permit a reasonable crosstabs[1] breakdown. The size of the St-Lawrence student population does not permit many categorical breakdowns beyond first and second year students.

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[1]Crosstabs is statistical jargon that refers to the examination for any important differences amongst data cast into categories.

The French language manuals and questionnaire, and an English version of the questionnaire, of the TRAC may be obtained from:

Co-op étudiante
Cégep de Sainte-Foy
2410, Chemin Sainte-Foy
Sainte-Foy, Québec G1V 1T3
(418) 659-6600

Scale Construction of the MSLQ, LASSI and TRAC

Table 1 presents a summary of scale characteristics for each of the instruments under study. We notice that all three instruments agree on the cognitive, motivational and time management constructs although each operationalizes them somewhat differently.

The **cognitive scales** include elaboration, information processing, organization, rehearsal, selecting main ideas, self-testing, study aids and test taking. The LASSI covers five of these areas while the TRAC addresses only one. It is possible to statistically recombine these scales into a new composite scale and then to examine how such the validity and reliability of this derived scale score compare with the validity and reliability of each of the MSLQ, LASSI and TRAC.

Reliability analysis will help us determine if a new scale, composed from each of the cognitive scales of the MSLQ, LASSI and TRAC, would better define the domain than is currently the case for any one instrument. Results of probit analysis should help us identify which specific skills, and to what degree, may be considered *minimal*.

The **motivational scales** are subdivided into anxiety, attitudes, and motivation subscales.

Anxiety is treated as a global entity by the MSLQ and LASSI while the TRAC addresses the phenomenon in more depth (27 items) and differentiates results in two areas: exam anxiety and failure anxiety. If it turns out that evaluation and performance anxieties are important in degree or in numbers of students afflicted, we should consider examining also learning anxiety. "Math phobia" is apparently

a common and widespread problem (Shrieves, 1993). This points to the fact that some discipline-specific learning anxieties exist.

According to the MSLQ (Pintrich et al. 1991; p.15) "Test anxiety has been found to be negatively related to expectancies as well as academic performance. Test anxiety is thought to have two components: a worry, or cognitive component, and an emotionality component. The worry component refers to students' negative thoughts that disrupt performance, while the emotionality component refers to affective and physiological arousal aspects of anxiety

Anxiety in the LASSI reflects the student's "...negative thoughts about one's abilities, intelligence, future, interactions with others, or likelihood of success..." and how such behaviors "...often sabotages a student's efforts (Weinstein, 1987; p.7)."

TRAC focuses directly on the highly specific evaluation and performance anxiety students experience in the academic testing situation. "Vous éprouvez peu de réactions d'anxiété avant, pendant et après les examens (Larose and Roy, 1991; p.5)." ["You manifest hardly any reactions before, during or after taking tests."] "Vous n'anticipez pas l'échec. Vous êtes habituellement confiant de réussir un examen (Ibidem)." ["You don't expect to fail. You are usually confident of passing tests."]

We can expect that the general anxiety scores reported by the MSLQ and LASSI to indicate potentially anxious students. The TRAC scores could help us determine if this anxiety is about testing. There appears to be a lack of items dealing with learning and evaluation anxieties. In this respect, high anxiety scores on the MSLQ or LASSI should be followed up with more specialized instruments and counselling. As Pintrich et al. put it: "Training in the use of effective learning strategies and test-taking skills should help reduce the degree of anxiety (p.15)."

Attitude scores reflect the general predispositions and goals of students for Cégep. The purpose of the attitude scale in the LASSI is to measure "...how school fits into their future (Weinstein, 1987; p.6)."

The MSLQ reports on task value, control of learning beliefs, and self-efficacy for learning and performance rather than attitudes as such. "Task value refers to the student's evaluation of the how interesting, how important, and how useful the task

is... (Pintrich et al., 1991; p.11" "Control of learning beliefs refers to students' beliefs that efforts to learn will result in positive outcomes (Pintrich et al., 1991; p.12)." Self-efficacy for learning and performance "...includes judgments about one's ability to accomplish a task as well as one's confidence in one's skills to perform that task (Pintrich et al., 1991;p.13)." Effort and ability, you will recall from the Introduction, have been shown to be critical variables operating in developmental education. Probit analysis will inform us as to just how well these MSLQ scales contribute to our understanding of their role in student study skills and learning strategy efforts and abilities and academic achievement.

The TRAC reports directly on students' perceptions of the role of their efforts and abilities on academic achievement. In this respect they are similar to the MSLQ but much more direct. The Effort scale (Croyance à la facilité) is described as: "Vous ne croyez pas à la facilité. Vous croyez que ceux et celles qui excellent fournissent des efforts et consacrent du temps à leurs études pour réussir (Larose & Roy, 1991; p.5)" ["You don't believe in success without effort. You believe that those who do well put in effort and time to be successful".] The belief (attitude towards) study skills and habits ("Croyance aux bonnes méthodes de travail") is reported as: "Vous croyez que l'effort et les méthodes de travail sont aussi importants que les aptitudes pour réussir (Ibidem)." ["You believe that effort and good study and work habits are as important as ability to be successful."]

We should expect to find strong inter-correlations amongst these attitudinal scores. However, the greatest contribution will be in the specific scale measures reported on the MSLQ. The differences in Task value scores from the control of learning beliefs or self-efficacy for learning and performance scores ought to suggest something about the interplay between students' task and personal effort perceptions. Such information would help us in knowing if we need to increase our "marketing strategy" to increase task value and/or work on student perceptions of personal effort.

The motivation scale measures students' responsibility and their willingness to put effort into their work. As Weinstein, (1987;p.6) puts it: "The degree to which students accept responsibility for studying and for their performance is reflected in the everyday behavior they exhibit related to school and school tasks."

The MSLQ has a broader coverage of the topic than the other two instruments. The additional information about type and degree of intrinsic versus extrinsic

motivation is important in helping us to estimate the relative standing of students on ego-oriented motivation. As Nicholls (1984) very well puts it: "When we are ego-involved, our own experiences of success and the amount of effort we expect to need for success are insufficient basis for estimating task difficulty or our chances of demonstrating ability (p.47)." Ego-oriented students are often personally threatened or overwhelmed by their perceptions of what the task requires and of their abilities to meet those demands. In this respect the additional information from the Effort regulation and Self-regulation scores would do much to help us understand the attributional processes of students and task perceptions in relation to academic achievement.

The LASSI takes into account the important role of attributional complexity when they state: "Accepting more responsibility *and attributing success to one's efforts* (my emphasis) results in more effective studying and school performance (Weinstein,1987; p.6)" So, it's not just getting *more* motivated but thinking differently about effort, which as we have seen through the work of Nicholls, would be an important part of getting students to do study skills.

The TRAC refers to the much broader concepts of "investing time and energy in your studies (p.5)". The TRAC goes in the opposite direction of the LASSI and lumps all types of ability and effort into the one general category. In this respect we should expect the motivation scale scores of students on the TRAC to have the greatest variation amongst the three instruments tested.

We should expect the most information about motivation from the MSLQ. This instrument makes important conceptual differences amongst type of motivation (intrinsic versus extrinsic), effort- versus self-regulation, and some differentiation amongst the levels of effort. The information from the Attitude and Motivation sections of the MSLQ, when combined with the information about the student's use of time management principles should help us understand if there is effort (working hard but not smart) or not working at all. The first case suggests correct attributions but the need for learning study skills and learning strategies. The second type of student needs motivational help (attributional re-training) first.

The **concentration and time management scales** report on students' self-management. The degree to which a student is able to focus or direct attention to the task and to control the effects of "...distractions, competing goals, and procrastination" is a measure of concentration. Making appropriate use of time and

resorting to appropriate study skills ("...creating and using schedules...") is a measure of time management.

The cognitive learning strategies are: information processing, selecting main ideas, study aids, self-testing and test strategies. The theoretical context is that these skills may be learned by students and enhance motivation by contributing to self-awareness. Information processing scores reveal how well students can paraphrase, summarize, create categories and, in general, elaborate and organize information "...to build bridges between what a student knows and what he or she is trying to learn and remember (Weinstein, 1987; p.8)."

Selecting main ideas "...involves separating out the important from the unimportant...(Weinstein,1987;p.9)." The phrase that comes to mind is "buzz words." Phrases and words like "This *classic* research...", "...*because* ...", "The *major* events that led up to..." and even sometimes "*My own* work has shown that..." are considered "buzz words" because they should trigger in the student a sudden realization that what is to follow is considered important (at least by the teacher!). How to recognize these buzz words is part of a study skills course. Such courses often include information about how to gather teachers' particular preferences.

The study aids score reveals the student's use of learning "tricks". Such behavior includes: underlining or highlighting, making annotated notes in the margin, outlining, comparing notes with other students or with the teacher etc. Again, this is usual fare for a course on study skills, or specialized references in a Cégep library. Of the many references available in our library, a typical one for students would be Geoffrion's (1993) Get Smart Fast: A Handbook for Academic Success. Teachers may wish to consult a companion book which has made its mark as an important resource: Thomas and Robinson's (1982) Improving Reading in Every Class: A sourcebook for teachers.

"Using mental reviews, going over class notes and the text, thinking up potential questions to guide reading or help prepare for an exam are all important methods for checking understanding, consolidating new knowledge, integrating related information ... and identifying if additional studying must be done (Weinstein, 1987; p.10)." These behavior are considered self-testing strategies.

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Test strategies refer to the type of test, ranging from simple recognition, application of principles, theories etc, to the recall of information for brief essays, as well as what methods to use to study for each type of test.

All in all, these scales measure what is consistently reported in the literature on how to help students develop study skills and learning strategies. For example, important references for the student, and the teacher interested in working with such a student, and intended to be used by the student are Bogue's Transferable study skills can be taught, Studying the Content Areas: Social Sciences & the Sciences and Fleet, Goodchild and Zajchowski's Learning for Success (1990).

Table 1: Scale descriptions[1] of the MSLQ, LASSI and TRAC and the number of items used in the scale.

Scale Category /scale names:	MSLQ	LASSI	TRAC
Cognitive Scales:	(19)[2]	(37)	(6)
Elaboration:	6	-	-
Information processing:	5[3]	8	-
Organization:	4	-	-
Rehearsal:	4	-	-
Selecting main ideas:	-	5	-
Self-testing:	-	8	-
Study aids:	-	8	-
Test-taking:	-	8	6
Motivation Scales:			
Anxiety:	(5)	(8)	(27)
Exam anxiety:	-	-	20
About failing:	-	-	7
Attitude:	(18)	(8)	(4)
Task Value:	6	-	-
Control of learning beliefs:	4	-	-
Self-efficacy for learning and performance	8	-	4
Motivation:	(24)	(8)	(8)
Intrinsic:	4	-	-
Extrinsic:	4	-	-
Effort regulation:	4	-	4
Self-regulation:	12	-	4
Time Management Scales:	(15)	(16)	(15)
Concentration:	-	8	6[4]
Time management:	(15)	8	-
Time/study:	8	-	-
Help-seeking:	4	-	5[5]
Peer learning:	3	-	4

1 = Some scales do not clearly overlap. In such cases they have been classified where there is the greatest overlap with the scales of the other two instruments.

2 = (bold) numbers in parentheses refer to total number of items in that particular scale or subscale.

3 = i.e "critical thinking" on the MSLQ.

4 = Specifically addresses attention "in class".

5 = Specifically targets help seeking "from professors".

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Chapter 3: Psychometric Aspects of the MSLQ,LASSI and TRAC with the population of St-Lawrence Students

Population, sampling and sample:

Descriptors of Saint Lawrence student respondents on whom the MSLQ, LASSI and TRAC were field tested are presented in Tables 2 through 10.

The sample of programs, presented in Table 2 on the next page, represents the distribution of students who took the Psychology courses to pre-validate these instruments. The distribution is heavily biased in favor of the Social Science students. There are about one-third of non-Social Science/Commerce students in the sample. The Cégep's overall enrollment is about one half of Social Science/Commerce students. So, although there is a bias in the direction of these students we still have enough "other" students for descriptive purposes.

Table 3, also on the next page, shows a slight difference between female and male respondents in favor of females from the Cégep population which is currently 60:40 in favor of females. Table 4, again on the next page, reveals that we have about equal numbers of students who consider themselves to be French-speaking or French-English bilinguals, with a sizable minority of Anglophones.

While the sex of the student may not be related to study skills and strategies the evidence is that students study differently depending on the type of test for which they have to prepare. Other programs use different types of tests, most notably problem-solving, which may be related to the students' study skills and strategies. Also, it may be possible for some students to attend St-Lawrence as part of a personal program in English immersion. For whatever reason, the size of the current sample does not allow a sex by program of study by mother tongue (2 x 2 x 3) since some cells would likely to be too small, or possibly empty. For now, the results apply to students in psychology courses, possibly to students registered in this department, and not likely to students in other programs. However, our major concern is not with representivity of programs but with representativeness of ability. Thus, the range of scores reported on the instruments is more an issue than the programs from which the sample is drawn. We wish to make inferences about student study skills and learning strategies with academic achievement. Program of study is, at best, a covariate since our population would probably not allow us to have this as an additional breakdown in any analyses.

TABLE 2: Distribution of Respondents by Programs of Study

Soc Sci	Comm	P&A /Hlth	Admin	Lang	Explor
59,8	8,7	16,3	3,3	7,6	4,3

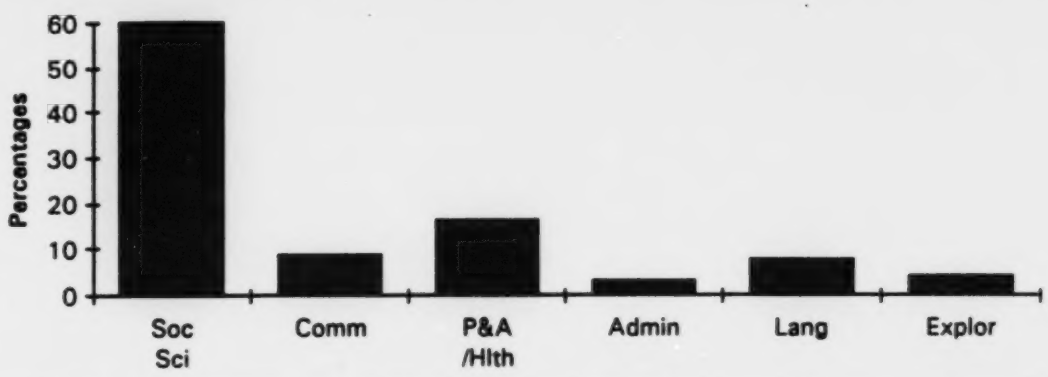


TABLE 3: Distribution of Respondents by Sex

Males:	Females
30,4	69,6

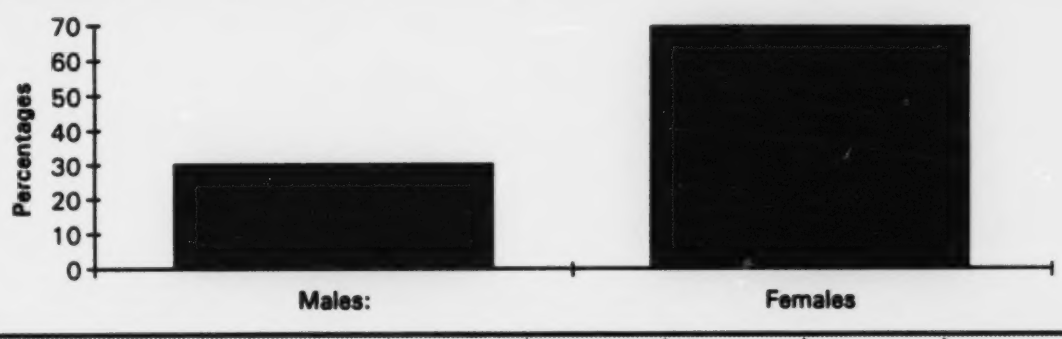
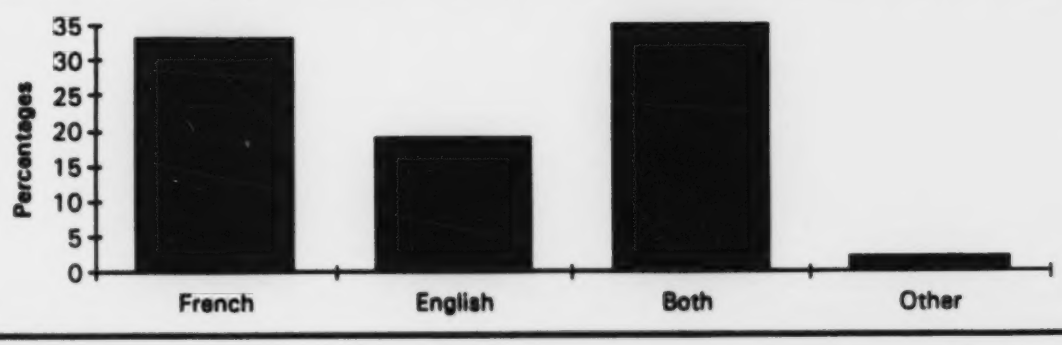


TABLE 4: Distribution of Respondents by Mother Tongue(s)

French	English	Both	Other	Missing
33	19	35	2	11



Tables 5 and 6, next page reveal that, as usual, the respondents are typical of the Cégep clientele which comes in directly from the preceding high school graduation class. That is, we may interpret that our clientele, and thus our respondents, are mostly recent, adolescent high school graduates. We have very few "adult" students, stop-outs or persons re-integrating the work force through one of the federal or provincial "back-to-work" through studies programs.

A far more important statistic is the "part-time" employment of students who also attend Cégep. Sixty-two percent (62%) of students in our sample (Table 7, next page) work while attending Cégep. Nearly 40% (40.5%) put in 9 or more hours of work per week. 15.4% of students work 17 or more hours a week. Socioeconomic studies have shown that this degree of part-time work, while carrying a full-time load, is conducive to abandons and failures. Our situation is somewhat "safe" since nearly 59% of students are taking 4 to 6 courses (see Table 8, page 53) which helps lighten the load from the usual 7 and sometimes 8 courses, on overload (see Table 8, page 53). The distinction of referring to them as "full-time" versus "part-time" is a matter of convenience since, for administrative purposes, the loads are probably classified as "full-time".

Table 9, also on page 53, provides baseline data to compare expected self-effort and self-regulated effort reported in the MSLQ. This seems desirable because we discussed, in part, student academic achievement as related to real versus "false" effort in the context of Covington's theory of motivated cognitions. Perhaps students' effort regulations and investments may be directly related to their performances. This topic is addressed in the following chapter.

The outstanding initial motive of our respondents for taking psychology is that it seemed "interesting" (see Table 10, page 54). It certainly can't be because students heard it was an easy course (95.7% reported "No!")! The other motives are to: "...help improve my academic skills", "...improve my career prospects", and because it "... fitted my schedule" and appears "Useful for other courses". The results of table 10 taken together suggest students were willing to take a course for intrinsic motives even if they expected to have to work "hard".

TABLE 5: Distribution of Respondents by Year of High School Graduation

1990	1991	1993	Other	Missing
4	14	24	4	10

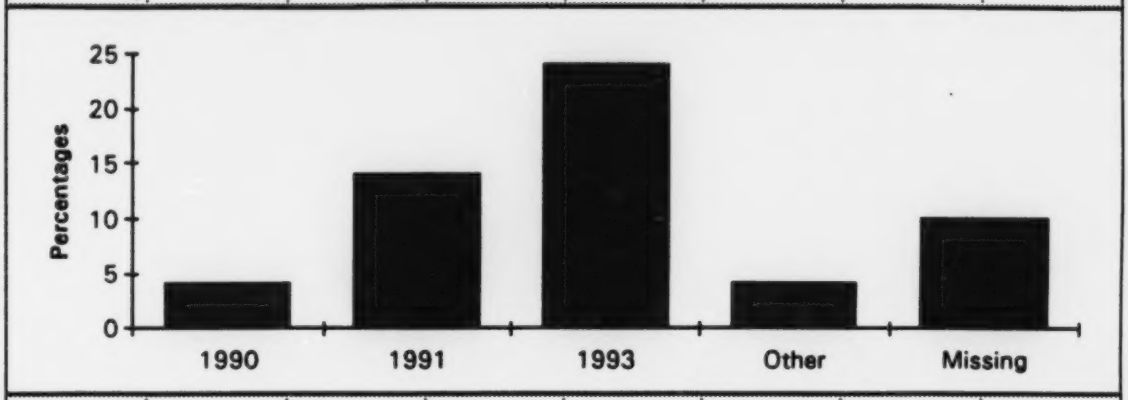


TABLE 6: Distribution of Respondents by Semester of Study

First	Second	Third	Fourth	Fifth +
24	6	41	4	16

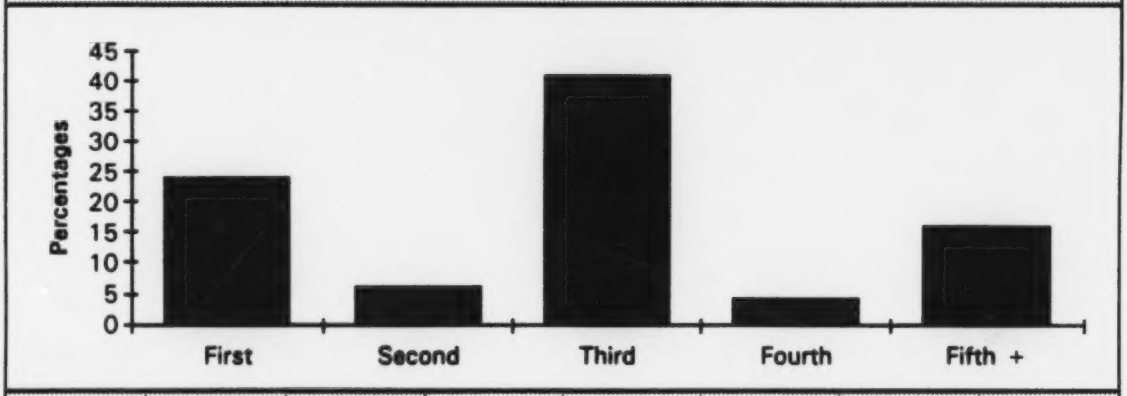


TABLE 7: Distribution of Respondents by Hours of Paid Work

none	1 to 4	9 to 12	13 to 16	17 to 20	21 & more
38	4,4	13,1	12	6,6	8,8

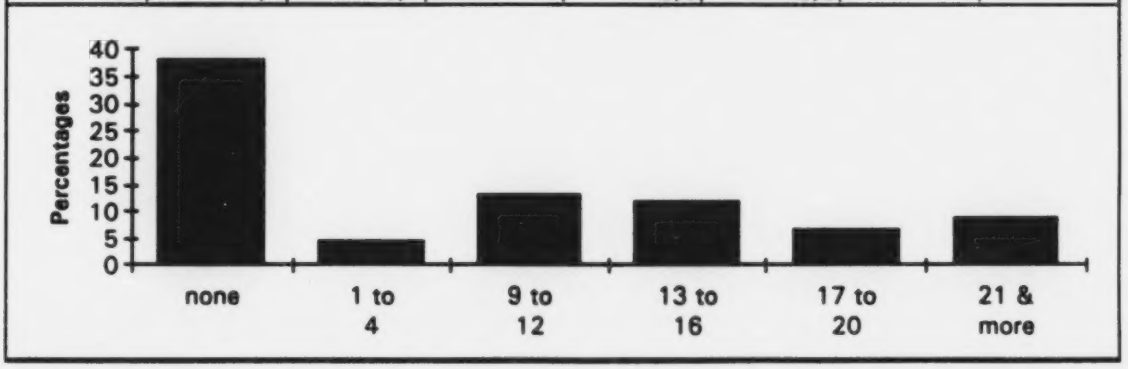


TABLE 8: Distribution of Respondents by Academic Load

Full time	Half-time	Part-time
39,1	58,7	2,2

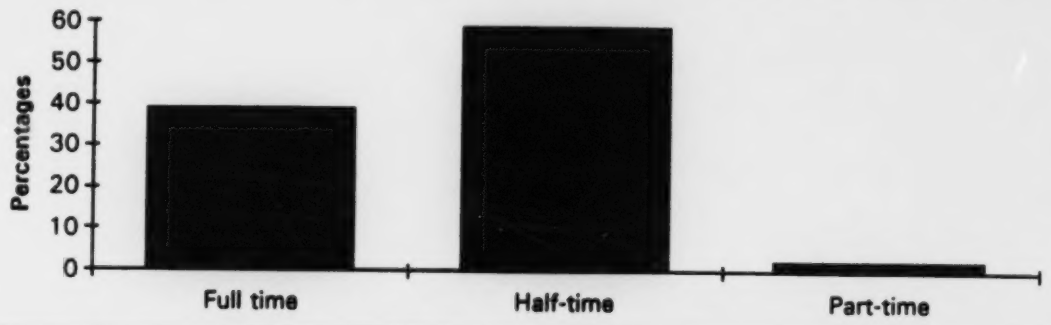


TABLE 9: Number of Hours Respondents Expect to Invest to Do "Well" in the Course

1	2	4	5	6	7	8+
3,3	13	20,7	15,2	12	5,4	3,3

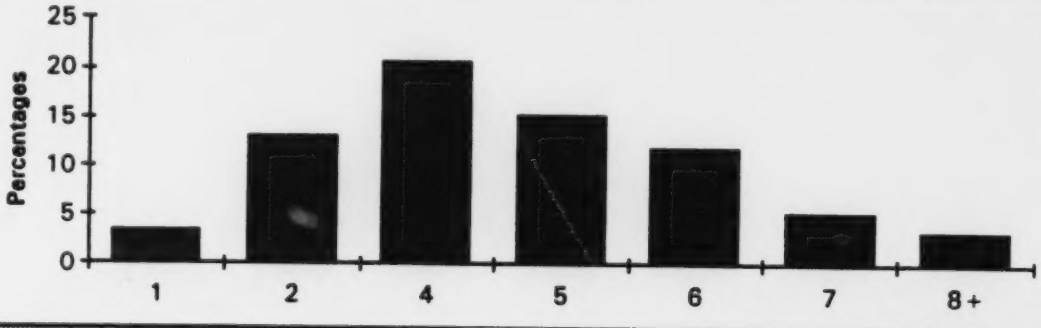
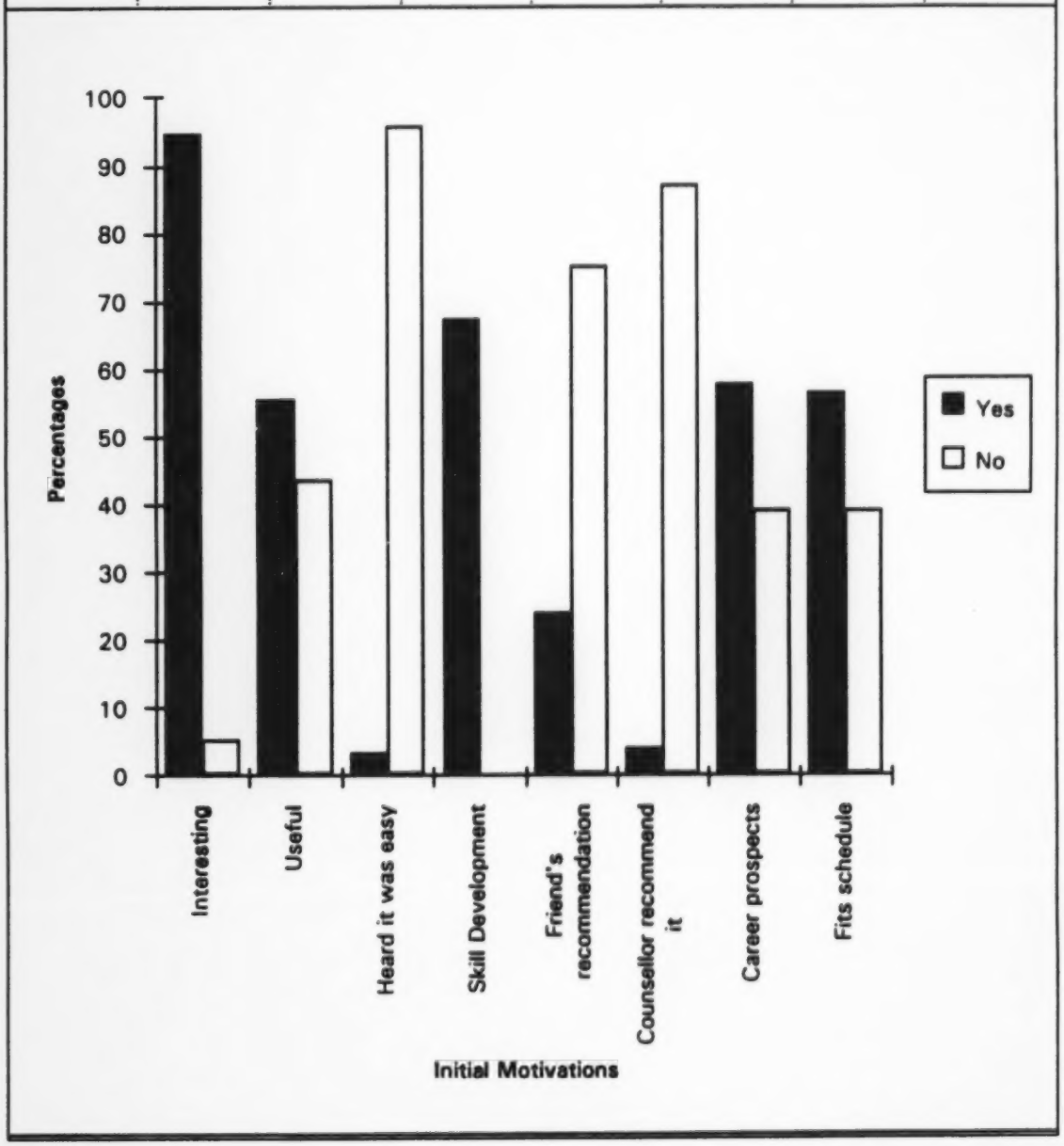


TABLE 10: Initial Motivations of Respondents to Register for the Course

	Yes	No
Interesting	94,6	5,4
Useful	55,4	43,5
Heard it wa	3,3	95,7
Skill Develo	67,4	29,,3
Friend's re	23,9	75
Counsellor	4	87
Career pros	57,6	39,1
Fits schedu	56,5	39,1



Validity: Measures of adequacy

Validity refers to asking questions which are known to be related to the problem under study. In this context validity means comprehensiveness. The test should relate to and adequately sample materials related to study skills and learning strategies. Validity, when it operates to involve the student by establishing good will is called *face validity*.

A question or questionnaire with *face validity* will not confuse the student with the wording, grammar etc. Face validity appeals to the student because what we ask them to do corresponds to what we give them to do. Face validity clearly paves the way for cooperation. The student is motivated to provide a frank effort to respond. Otherwise, when face validity is low, the student may think there is some alternative and manipulative purpose. An example is to tell students that we are going to ask them to answer a brief questionnaire and then we hand them a stack of sheets with 100 items!

Content validity refers to a question that relates to the topic and with the other domain referenced questions. A question or questionnaire with content validity is one which has been drawn from a population of topics and concepts, in which both the persons who will use the information to intervene and the persons responding to the questionnaire, feel is an adequate sampling of their study skills and learning strategies. Content validity, in psychometric terms, provides context, input, process and product evaluation.

The *context of content validity* reveals how well objectives and questions relate to actual study and strategy behavior. The impact of context is to be able to efficiently plan intervention actions. *Input of content validity* refers to the fact that if we are measuring study skills and strategies then focusing on anxiety in our questioning somewhat distorts the operational definition for study skills and learning strategies. If anxiety is the focus in building the questionnaire, then dealing with academic anxiety will be the action plan that one must work with (*processes and products* of content validity).

Concurrent validity refers to the fact that questions and scores should relate (i.e. "concur") with other known questions and tests which also measure some aspect of the criterion or target variables under study (i.e. study skills and learning strategies). This means that student test performances on each scale should

correlate highly with at least other similar scales. The simultaneous examination of three leading instruments, LASSI, MSLQ and TRAC, on the same sample provides us with a very good opportunity to examine concurrent validity.

A second meaning for concurrent validity is when it refers to scores on the instruments and the students' grades taken about at the same time. So, when we report on predictive study in this interim report we are actually talking about concurrent validity since the time at which students wrote the instruments and the mid term grades were close in time (2 to 4 weeks).

Predictive validity is determined by analyzing differences in persistence and achievement between two groups of students: those who generated the results, and an independent criterion group. The students who manifest study skill and learning strategy difficulties would be expected to have scores opposite to those who show no such problem behavior. The scores on the test provide reasonably sound information to predict who is likely to need study skills and learning strategies counselling before the debilitating effects of lowered self-esteem and frustration set in. The scores on the instruments tested and the Final Course grades and/or the Final Exam grades will be a good test of the predictive power of these instruments. In this case we should expect relatively high correlations between scale scores and their power to predict student achievement. Multiple regression analysis will help us understand this relationship.

The discriminative power of a scale or question, *discriminant validity*, refers to the contribution the item or scale makes to understanding differences between students who start off poorly and continue to do poorly, or who start off poorly and then do okay; or then again, students who start off okay and then do poorly, or who continue to do okay. Probit analysis will help us determine just how much of a particular level of study skill or strategy is necessary to make the difference, or discriminate amongst these four target groups. At what point to we start accepting that a specfic score is low enough to be an indication of a study skill or learning strategy problem?

Validity of the MSLQ, LASSI and TRAC

The face validity of the MSLQ, LASSI and TRAC are excellent. Questions are straightforward and clear. There were occasional words or expression in the American English that revealed a cultural bias. So, revisions were made to the

standard questionnaires based on feedback provided by 90 students in the Fall, 1992 session, who read the initial MSLQ and LASSI and suggested words, phrases etc. which presented difficulties. The only word remaining that seems to cause problems is "procrastinate" (Q#36) on the LASSI. Also, students preferred the 5-choice answer stems for the LASSI than for the MSLQ or TRAC.

Content validity of the instruments is a global one. All three instruments, if you recall Table 1, page 47, covered the study skills and learning strategies domain. In this respect a recombined instrument of scales with predictive validity may increase the content validity. In this respect we present the predictive validity between MSLQ, LASSI and TRAC scales with mid-term grades. We may more accurately describe these results as concurrent validity since the administration of questionnaires preceded mid-term grades by 2 to 4 weeks. The Final Exam grades and Final Course grades will have about a 2 1/2 to 3 months time interval.

Table 11. Validity of the MSLQ. Correlations between Mid-term grades and the scales on the MSLQ.

INTRGO	EXTRGO	TASK	CLB	SELP	TESTANX
.0552	.0126	.0065	.1507	.4848**	-.4366**
REHEARSE	**ELABORAT**	**ORGANIZE**	**CRITTHNK**	**SELFREGU**	**TIMESTUD**
-.1018	.1494	.0453	-.1033	.2855*	.2415
EFFREGU	**PEERLRN**	**HELPSEEK**			
.1184	-.0389	.0983			

N of cases: 84 1-tailed Signif: * - .01 ** - .001

In the MSLQ instrument we find that Self-efficacy for learning and performance ("SELP") is highly (99.9%) related to mid-term grades. So is Test anxiety ("TESTANX") which is, as would be expected, highly (99.9%) and negatively correlated with mid-term grades. It is rather a disappointment that none of the other scales have attained significance because the MSLQ did offer more depth into several important cognitive and motivational areas. Apparently students cannot be expected to discriminate such realities at this time in their lives.

Table 12. Validity of the LASSI. Correlations between Mid-term grades and the scales on the LASSI.

LASSIATT	LASSIMOT	LASSITMT	LASSIANX	LASSICON	LASSIINP
.3927**	.4311**	.3297**	.3716**	.2421	.0051
LASSISMI	**LASSISTA**	**LASSISFT**	**LASSITST**		
.2348	.0801	.1494	.2649*		

N of cases: 91 1-tailed Signif: * - .01 ** - .001

The LASSI shows Attitudes ("ATT"), Motivation ("MOT"), Time Management ("TMT") and Test Strategies ("TST") to be significant at 99%. The LASSI scores on these scales would do much to help us assess fundamental levels of student attitudes and motives for attending Cégep, their use of time and approaches to taking tests, as well as good indications of the debilitating effects of anxiety.

Table 13. Validity of the TRAC. Correlations between Mid-term grades and the scales on the TRAC.

TRACRA	TRACAE	TRACPE	TRACQA	TRACRP	TRACE
-.1973	-.4831**	.3637**	.3462**	.2607*	.1067
TRACCM	**TRACCF**	**TRACPAE**			
.0061	-.3833**	.3609**			

N of cases: 92 1-tailed Signif: * - .01 ** - .001

The TRAC helps us to understand that failure anxiety ("TRACAE") and <u>not</u> exam anxiety ("TRACRA") are major sources of concern for our students in psychology. We have to be careful here because a special effort is made in psychology to reduce exam anxiety by showing students how test strategies are tied to reading comprehension strategies. Students report attention problems in class ("TRACQA"), seeking help from the professor ("TRACRP"), effort regulation ("TRACCF") and attitudes about the importance of Cégep studies ("TRACPAE") as related to their performances.

Of the three instruments field-tested the single best choice, if we must narrow it down, is the TRAC. Six of the 9 scales are highly significant. Thus the LASSI has the best discriminant validity. However, the time management and test strategy questions on the LASSI ought to be retained. If we were to insist on a single brief in-class set of questions we should consider administering the self-efficacy for learning and performance from the MSLQ since its primary characteristics is to suggest general problems that are picked up by the LASSI and TRAC.

Reliability: Measures of consistency

Reliability refers to the consistency of results over time. Thus a reliable question or questionnaire is one which would make it possible to determine, over a given time period, the relative stability of a student's answer(s). Reliability also implies objectivity and fairness. Reliability must precede validity since an unfair item or questionnaire will be unreliable. An unreliable instrument does not contribute to helping examiners better understand the relationship of student study skills and strategies to meeting academic tasks.

Validity and reliability are related to each other in a way that allows examiners to understand how much better off they are in knowing a student's study skills and learning strategies for doing the course work. Simple trial and error or guessing strategies should fare much worse than methodological and systematic learning efforts. Put differently, a valid and reliable instrument to assess student study skills and strategies to meet academic requirements should help us detect possible students with difficulties in approaching academic work before it is too late.

Several measures of reliability are necessary to check on the reliability of an instrument. These are: Item to scale consistency, item to test consistency, and scale to test consistency. In calculating the degree of relationship ("correlation") between the student's score on the question, scale or test and the criterion (performance on academic tasks) we can arrive at an estimate, using a simple formula, of how much better off we are than merely guessing at this relationship ("proportional reduction of error" or simply "PRE"). The following example should help us to avoid the jargon related to these concepts, and to show the intuitiveness of statistical analyses.

For example, student scores on one quiz and their final exam grade (criterion) can be calculated for the degree of relationship (correlation, or "r"). Assume that the quiz has a correlation of 0.80 with final grades, then, using the following formula,

$$PRE = 1 - \sqrt{1-r^2}$$

we find that,

$$PRE = 1 - \sqrt{1-(0.80)^2}$$

$$PRE = 1 - \sqrt{1-(0.64)}$$

$$PRE = 1 - \sqrt{0.36}$$

$$PRE = 1 - 0.60$$

$$PRE = 0.40$$

This translates into the fact that we are 40% better off in understanding how well students do on final exams from knowing how well the students do on that particular quiz. If the derived validity estimate ("PRE") had been much weaker, say 0.20, or 20%, then we ought to consider replacing the quiz or examining the degree of overlap between the objectives measured by the quiz and those on the final exam. We are, of course, working under the assumption that the final exam is an achievement test with summative evaluation. It is based on reviewing the domain of all concepts in the course in which these same concepts were parcelled out in a variety of in-class tests or assignments. The PRE information, when we know that the Final Course Examination and the in-class quizzes have sampled the same domain of concepts, informs us of the student's ability to work with the concepts when some of the cues for limiting the domain have been removed. In other words, the student knows that the Quiz covering Chapters 1 through 4 requires the use of concepts from those same chapters. The Final Course Examination removes such cues. We recognize then when the final exams in courses are a "little tougher", as students put it.

The purpose of *item to scale consistency* is to provide us with a measure of just how well this particular question fits in with the rest of the questions on the particular scale. The purpose of the scale on an instrument, you will recall, is to group together several questions which measure a common trait. How many questions are necessary and how well they fit together is reported by the item to

scale consistency score. The same thinking applies to *item to test consistency*, and to *scale to test consistency* with the differences that we are now concerned with how well the item or question fits in with the whole test, or the scale (group of questions) fits in with the whole test.

Reliability of the MSLQ, LASSI and TRAC

The univariate statistics (mean, median, mode and standard deviation) for the MSLQ, LASSI and TRAC are presented in Tables 14, 15 and 16. The average scores for the items vary according to the number of items in the scale. What is particularly important is the range ("Min.-Max.") of scores expected versus observed. We find, on the LASSI in Table 14, for the "attitude and interest," and "motivation and self-discipline" scales that the lowest scores expected (8) is considerably lower than the observed 19 and 18 for these same scales, respectively. These results suggest that minimal levels were not sampled. I doubt we could observe scores much lower, although they are possible, because it seems reasonable to suppose that students must have some minimal levels of attitudes, interest, motivation and self-discipline to attend Cégep. The other differences between observed and expected minimal/maximum scores are slight.

The scores on the MSLQ, Table 15, reveal that students sampled have better elaboration, and self-regulation and much better control of learning beliefs, self-efficacy for learning and performance, and, time and study management than the lowest possible scores would suggest. Thus, this sample of students, if anything, appears to have better skills in these areas.

As for the TRAC, Table 16, only the scores on the "attitudes towards study skills and habits" appears to be slightly higher than the minimum scores suggested on this TRAC scale. On all instruments, and for all scales, with the exception of "help seeking" from the professor on the TRAC, our students have attained the highest levels possible, as suggested by these instruments.

So, in summary, we have students who are as able as any, and, we have students who fare somewhat higher on certain scales. In this respect the students in our sample appear to be somewhat better in study skills and learning strategies than the populations on who these instruments were validated. This is probably an artifact that will decrease, if not, disappear if we sample a larger group of students.

Table 14: Descriptive statistics for SLC students' scores on the LASSI.

SCALES:	Mean	Median	Mode*	Std.Dev.	Expected Min.	Expected Max.	Observed Min.	Observed Max.	LASSI Percentiles** Lower Quartile n=	Lower Quartile %N=	Lower Quartile Scores	Upper Quartile n=	Upper Quartile %N=	Upper Quartile Scores	N3*=
1. Attitude and Interest	31.8	32	31	5.0	8	40	19	40	23	23.7	LE4*28	25	25.8	GE4*36	97
2. Motivation & Self-discipline	31.3	31.5	27	5.5	8	40	18	40	21	21.6	LE26	24	24.7	GE37	97
3. Time Management Principles	25.2	26	27*	6.8	8	40	10	40	21	21.9	LE19	23	24.0	GE30	96
4. Anxiety/worry	24	24	14*	7.7	8	40	9	40	20	20.6	LE16	23	23.7	GE31	97
5. Concentration and Attention:	26.6	26.5	24	6.6	8	40	12	40	23	24.5	LE22	22	23.4	GE32	94
6. Information Processing	26.6	26	24	6.3	8	40	8	40	25	26.0	LE22	24	25.0	GE32	96
7. Selecting Main Ideas/Recognizing Important Information	18.6	19	19	3.8	5	25	6	25	22	23.4	LE16	20	21.3	GE22	94
8. Use of support techniques and materials	24.1	23	23	5.7	8	40	10	38	19	19.8	LE19	19	19.8	GE30	96
9. Self-testing, reviewing, and preparing for classes	24.1	24	27	6.1	8	40	11	40	24	24.7	LE19	22	22.7	GE28	97
10.Test-taking strategies and test preparation	29.1	30	28	5.9	8	40	13	40	23	23.7	LE24	21	21.6	GE35	97

* When multimodal categories exist only the lowest is reported.

** LASSI percentiles, as given in the LASSI manual, were applied for lower and upper quartiles.

3*N refers to the total size of the SLC student sample for that scale.

4* LE and GE refer to "Less to or equal to" and "Greater than or equal to".

Table 15:Descriptive statistics of SLC students' scores on the MSLQ.

SCALES:	Mean	Median	Mode*	Std. Dev.	Expected Min.	Expected Max.	Observed Min.	Observed Max.	MSLQ Percentiles** Lower Quartile n=	Lower Quartile %=	Lower Quartile Scores	Upper Quartile n=	Upper Quartile %=	Upper Quartile Scores	N[3*] =
MOTIVATION															
1.Intrinsic Goal	21.6	22	21	3.9	4	28	6	28	24	24.7	LE[4*]19	23	23.7	GE[4*]25	97
2.Extrinsic Goal	21.4	21	20	3.7	4	28	8	28	27	27.6	LE19	30	30.6	GE24	98
3.Task Value	35.6	37	39*	5.8	6	42	9	42	23	23.5	LE32	26	26.5	GE40	98
STRATEGIES															
4.Rehearsal	17.5	17	16	5.1	4	28	5	28	21	21.6	LE13	26	26.8	GE21	97
5.Elaboration	27.3	27	25	6.6	6	42	12	42	25	26.0	LE22	26	27.1	GE32	96
6.Organization	18.5	19	18*	5.4	4	28	6	28	25	26.0	LE14	25	26.	GE23	96
SELF-DISCIPLINE															
7.Control of Learning Beliefs	23.1	24	25	3.2	4	28	14	28	22	22.7	LE20	23	23.7	GE26	97
8.Self-efficacy for Learning and Performance	43.3	44	39*	7.3	8	56	21	56	22	23.2	LE37	22	23.2	GE49	95
9.Self-Regulation:	54.8	55	48	11.9	12	84	18	84	24	25.5	LE47	25	26.6	GE62	94
10.Effort Regulation	21.7	22	20*	4.2	4	28	4	28	27	28.4	LE19	26	27.4	GE25	95
STUDY SKILLS															
11.Time & Study Management:	42.6	42	42	8.0	8	56	26	56	25	25.8	LE37	23	23.7	GE50	97
12.Peer Learning:	9.2	9	8*	4.0	3	21	3	20	26	26.5	LE6	27	27.6	GE12	98
13.Help Seeking	16.4	17	19	4.9	4	28	5	27	20	20.6	LE12	20	20.6	GE21	97
Test Anxiety	20.0	19.5	16	7.7	5	35	5	35	28	29.2	LE15	27	28.1	GE26	96
Critical Thinking Skills	21.2	22	24*	5.6	5	35	8	32	25	26.0	LE17	23	24.6	GE26	96

* When multimodal categories exist only the lowest is reported.

** MSLQ percentiles were estimated by taking the top and bottom quartiles in the sample.

3* N refers to the total size of the SLC student sample for that scale.

4*LE and GE refer to "Less to or equal to" and "Greater than or equal to".

Table 16:Descriptive statistics of SLC students' scores on the TRAC.

SCALES:	Mean	Median	Mode*	Std. Dev.	Expected Min.	Expected Max.	Observed Min.	Observed Max.	TRAC Percentiles** Lower Quartile n=	Lower Quartile %=	Lower Quartile Scores	Upper Quartile n=	Upper Quartile %=	Upper Quartile Scores	N [3]*
1.Attitude towards Cégep studies	19.7	20	19	5.4	4	28	7	28	21	22.6	LE[4]15	20	21.5	GE[4]25	93
2.Test-taking	28.8	29	29*	7.3	7	42	9	42	20	21.5	LE22	23	24.7	GE35	93
3.Exam anxiety	75.3	79	93	26.5	20	140	23	135	20	21.5	LE49	20	21.5	GE94	93
4.Failure anxiety	24.5	23	11*	11.6	7	49	7	49	22	23.7	LE13	23	24.7	GE35	93
5.Attitudes towards study skills and habits	23.7	24	27	3.5	4	28	13	28	21	22.6	LE21	25	26.9	GE27	93
6.Concentration (in-class attention)	28.5	29	33	6.9	7	42	8	42	19	20.7	LE22	19	20.7	GE34	92
7.Help-seeking from professor	21.3	21	19	6.7	7	42	7	34	21	22.6	LE15	23	24.7	GE27	93
8.Peer learning	18.4	19	19	5.5	4	28	4	28	22	23.7	LE15	24	25.8	GE23	93
9.Beliefs in effort regulation	15.1	15	15*	5.2	4	28	4	27	18	19.4	LE10	21	22.6	GE19	93

* When multimodal categories exist only the lowest is reported.

**TRAC percentiles were estimated by taking the top and bottom quartiles in the sample.

3* N refers to the total size of the SLC student sample for that scale.

4*LE and GE refer to "Less to or equal to" and "Greater than or equal to".

The real test of reliability rests with the reports of interitem correlation coefficients, scale and summary statistics which are used to calculate Cronbach's alpha ("α"). Alpha is reported as a correlation coefficient ranging from 0.0 to 1.00. The difference between alpha and the standardized alpha reflects the degree of variance in the scores. We interpret that the scale items focus on a common entity because items are positively correlated with each other. "Cronbach's alpha tells us how much correlation we expect between our scale and all other possible 8-item scales measuring the same thing (Norusis, 1990; section B p.190)".

Alpha is sensitive to the number of questions making up the scale as well as the degree of correlation between items. The larger the number of items in the scale the more alpha tends to increase. Thus it is noteworthy that we have obtained a strong alpha for such brief scales (with the exception of the anxiety scale with 27 items on the TRAC). In fact, we can see in Tables 14 through 16, that the two strongest alpha's are precisely for the TRAC (Table 16) Exam and Failure Anxieties.

Tables 17 through 19 present the observed and standardized alpha coefficients which are the best available means of estimating reliability of test items, scales and the instrument.

The Extrinsic Motivation, Control of Learning Beliefs, and Help Seeking scales of the MSLQ, reported in Table 17, are the weakest but, nonetheless, are still reliable. Task Value, Self-Efficacy for Learning and Performance, Test Anxiety and Self-Regulation are all highly reliable.

The LASSI and TRAC scales (tables 18 and 19) are all consistently high in reliability.

Table 17: Reliability of the MSLQ scales.

Scale Names:	Alpha	Standardized alpha
Intrinsic Motivation	.6979	.7175
Extrinsic Motivation	.4554	.4745
Task Value	.8594	.8822
Control of Learning Beliefs	.4947	.5284
Self-Efficacy for Learning and Performance	.8975	.9056
Test Anxiety	.8193	.8194
Rehearsal Strategies	.6881	.6872
Elaboration Strategies	.7280	.7435
Organization Strategies	.7344	.7424
Critical Thinking Skills	.7503	.7538
Self-Regulation	.8339	.8381
Time and Study Management	.7638	.7737
Effort Regulation	.5935	.6149
Peer Learning	.6137	.6215
Help Seeking	.4953	.4857

Table 18: Reliability of the LASSI scales

Scale Names:	Alpha	Standardized Alpha
Attitudes	.7045	.6935
Motivation	.7956	.7950
Time Management	.8190	.8231
Anxiety	.8961	.8969
Concentration	.8512	.8526
Information Processing	.8511	.8536
Selecting Main Ideas	.8039	.8025
Study Aids	.7211	.7166
Self-Testing	.7924	.7898
Test Strategies	.8616	.8611

Table 19: Reliability of the TRAC scales.

Scale Names:	Alpha	Standardized alpha
Exam Anxiety	.9519	.9525
Failure Anxiety	.9238	.9237
Test Preparations	.8692	.8729
In-Class Attention	.7721	.7682
Seeking Professor's Help	.7869	.7899
Peer Learning	.8197	.8234
Attitudes towards Study Skills and Work Habits	.6258	.6184
Effort Regulation	.7145	.7132
Importance of Cégep Studies	.7746	.7766

Standardization: To whom may we generalize results?

The psychology teachers have learned what about student study skills and learning strategies they should focus on during academic advising tasks. We cannot be sure that other aggregates of students from other disciplines will have similar results because our sample does not represent such aggregates.

What is generalizable is the process that we used to understand and prepare teachers for their academic advising tasks. Although the procedure seems long and complicated the advent of computer technology makes it feasible for us to test students one day and return detailed feedback to them and to their teachers within 48 hours. Ideally, for validation purpose, students would be tested once at the beginning of the course, once at mid-term (optional) and once at the end of the term. Thereafter one administration at the beginning of the course would be sufficient. One teacher from each discipline would be sufficient to make inferences about student study skills and learning strategies for each discipline and a composite for the Social Science program students.

Tests and especially test scores are not without having problems. We do not recommend accepting the test score as such. A low score too easily stigmatizes a student which may lead to self-defeating and self-handicapping behaviors in a vicious circle through the self-fulfilling prophecy. The range of scores is what must be reported to the student. This range is set by the examiners partly as the result of consideration given to the standard error of measurement, and partly based on the validity and reliability coefficients for the scale. The focus of the report given to the student is not on the normative meaning of the score (all such references would be dropped) but rather on descriptions of behaviors that he or she can learn and change. The aim is to get students to think differently about procedural knowledge (how, when and where to study).

Standardization of the MSLQ, LASSI and TRAC

The cutoff points for each instrument presented in Tables 14 through 16, under "percentiles", in the last column, with those generated by the final course grade show that it may be possible to build local norms. These estimates, trichotomized into three groups: the upper and lower quartiles and the undistributed 50% in the middle. As we increase the size of the sample to the full population of entering

students we may find it is possible to spread out results into five, perhaps even seven categories instead of the three used for this pilot study.

However, building norms will have to be based on autoregression and integrated moving averages (ARIMA) models of each entering cohort since we will never have a large enough sample, even if it is the full cohort of first year students, to cover all cells in a crosstab analysis based on the underlining continuous variables (instrument scale by grades). For example if the instrument scores range from 1 through 42 and grades range from 59% or less through 99%, then a 42 x 42 table requires 1764 cells. Clearly we would have to move to more appropriate statistical procedures, such as building linear regression equations, as Cégep Ste-Foy does, and using this procedure as the basis of academic advising for each cohort of students rather than on establishing the inauspicious "standardized norms".

The autoregression and integrated moving averages would simply allow us to know how much more or less of certain study skills or learning strategies the present cohort of students needs vis-à-vis former cohorts of students.

Recommendations

For teachers who are interested in fitting academic advising to students' academic needs we suggest the validation of these instruments in your discipline. We offer you the expertise, the equipment and questionnaires, and the statistical analysis of results. If enough of us in the Social Sciences Department join in we could be in an excellent position to ascertain the needs of our students and then to report the suggested remedies in the Departmental Student Handbook.

We may even envisage including a quick and reasonably reliable and valid diagnosis of student difficulties in this handbook. Then we could let students approach their formal academic advisors or choose to talk about the results with concerned /interested teachers. The "self-efficacy of learning and performance" from the MSLQ is warranted.

The academic advising we have been conducting in Psychology is confirmed with these results. Our students are concerned with 'test anxieties', 'test strategies and preparations' and 'self-efficacy for learning and performances'.

Edgard Pitre and I are undertaking to revamp the way we teach Introduction to Psychology to implement these results. The major characteristics are to get students involved in what we do with psychology rather than passively reading and listening to what others do with it. We are developing situations in which students won't feel they have to put in "false effort". The classroom activities, demonstrations, discussions etc. focus on time-on-task rather than on normative effects. We plan to field test many of these activities in the Winter, 1994 session.

Chapter 4: Results of Student Performances With Respect to Entry-Level Study Skills and Learning Strategies

The data in the following tables reveal several study skill and learning strategy variables that apply to student academic performances. The data in the "Prob(ability)", see the entry in the last column, reveal how well the data fits the model retained for analysis[2]. Values approaching the upper limit of 1.000 suggest good (0.500) to excellent (0.900) models for the observed data sets. The 'Coefficient' column lists the Beta values used in linear regression of scale scores (independent variables) on final course grades (dependent variable).

The critical variables are the 'Ratio of Coefficient ÷ Standard Error' and the 'Prob(ability)'. The regression coefficient when compared to the standard error provides an index of the strength of association between the two variables. The probability score reveals the goodness of fit[3] between the model (loglinear analysis) and the data.

All scale scores for the MSLQ, LASSI and TRAC were trichotomized according to the lower quartile (Group 1), middle 50% (Group 2) and the upper quartile (Group 3). The dependent measure, final course grades, was also trichotomized into three groups: Group 1 (00 to 65%), Group 2 (66%-79%) and Group 3 (80%-99%). These arbitrary points were chosen since they approximated the upper, middle and lower thirds of group performances. The 65% limit was chosen because there is some subjectivity (1% to 5%) or "evaluation" that accompanies all measurement schemes.

Table 20, on the following page, reveals that several variables appear on the MSLQ which are related to course work performances. All students seem affected by exam anxiety. This result is in keeping with current international work on academic achievement and with local observations (Talbot, 1993) about student inhibitions, fears, phobia, or anxiety for taking math or math-related courses.

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[2]The interested reader is referred to Norusis (1990) **SPSS/PC+ Advanced Statistics 4.0**, Chapter 6 for a succinct analysis of the merits of the loglinear model of analysis. Loglinear analysis prpvided information about Crosstabs between categorical, nominal data. Also it tested how well the data, a non-representative sample of convenience, fitted the model of analysis.

[3]"Goodness of fit" is statistical jargon to refer to how well the observed data frequencies match the expected data frequencies.

Extrinsic goal orientation and peer learning on the MSLQ have very little discriminating power between the upper and lower scorers and their final course grades. Apparently everyone is motivated by extrinsic goals. It appears that everyone also makes use of "peer learning". It may be interesting to re-write these questions since, as experience dictates on this Campus, that upper and lower achieving students have quite different perceptions of what it means to "consult" peers.

It is interesting to note that self-efficacy for learning and performance, along with two other closely related scales, self-regulation and effort regulation, appear to discriminate well amongst the upper and lower achievers. However, loglinear analyses fail to establish any relationship between these scales and final course performances. (See "effort regulation" and "self-regulation in Table 20 below.)

Table 20: Loglinear regression of MSLQ scales[4] on Final Course Grades

Scale:	Coefficient	Standard Error	Ratio of Coeff/Std.Err.	Likelihood ratio	Prob.
Intrinsic Motivation	0.1509	0.1952	0.77	1.1089	0.775
Extrinsic Motivation	0.1943	0.1772	1.10	6.3213	0.097
Task Value	0.0819	0.1889	0.43	1.4625	0.691
Control of Learning Beliefs	0.3053	0.1993	1.53	1.4435	0.695
Self-Efficacy for Learning and Performance	1.2593	0.3201	3.93*	0.9255	0.819
Test Anxiety	-.9761	0.2371	-4.12*	0.2870	0.515
Rehearsal Strategies	-.0198	0.1922	0.10	3.3109	0.346
Elaboration Strategies	0.3719	0.1898	1.96	4.2611	0.235
Organization Strategies	0.0729	0.1911	0.38	1.2027	0.752
Critical Thinking Skills	0.1248	0.1862	0.67	3.3750	0.337
Self-Regulation	0.6097	0.2107	2.89*	0.7749	0.855
Time and Study Management	0.4088	0.1999	2.05(?)	1.7093	0.635
Effort Regulation	0.6652	0.2067	3.22*	0.8740	0.832
Peer Learning	-.3226	0.1868	1.73	5.1583	0.161
Help Seeking	-.2499	0.1956	1.24	4.0893	0.252

* significant / (?)=likely significant since the model and data fit well (p=0.635)

[4]The MSLQ scales were trichotomized according to criteria set in Table 15. That is Group 1 (lower quartile), Group 2 (middle 50%), and Group 3 (upper quartile).

The results of the loglinear regression of LASSI scale scores on final course grades (Table 21) supports the results obtained with the MSLQ. Anxiety is still a primary concern with time/study management and in-class attention as very close 2nd and 3rd order problems. The weak fit between the observed data and the linear-linear loglinear model for motivation, selecting main ideas, and test preparations *may be* due to sampling problems since the coefficient/standard error ratios are respectably high. Multiple regression analysis with these as independent variables will help shed some light on this issue.

Table 21: Loglinear regression of LASSI scales[5] on Final Course Grades

Scale:	Coefficient	Standard Error	Ratio of Coeff/Std.Err.	Likelihood ratio	Prob.
Attitudes	0.5478	0.2109	2.60#	3.0790	0.380
Motivation	0.7344	0.2373	3.09	5.2544	0.154
Time Management	0.7975	0.2358	3.38*	0.6580	0.883
Anxiety	0.8807	0.2604	3.38*	2.7751	0.428
Concentration	0.8030	0.2338	3.43*	2.2876	0.515
Information Processing	0.2819	0.1929	1.46	5.2366	0.155
Selecting Main Ideas	1.0675	0.2683	3.98#	4.1739	0.243
Study Aids	0.2682	0.2145	1.25	1.2310	0.746
Self-Testing	0.4590	0.2066	2.22#	1.9596	0.581
Test Strategies	1.1456	0.3044	3.76#	3.6127	0.306

* Significant

#Likely to be significant under a more adequate and complete sample of students

[5]The LASSI scales were trichotomized according to criteria set in Table 14. That is Group 1 (lower quartile), Group 2 (middle 50%), and Group 3 (upper quartile).

The TRAC results suggest that in-class attention, seeking the professor's help and peer learning are only somewhat more important than anxiety. Interestingly the data suggest that the student's perceptions of the importance of Cégep studies may be a discriminating variable.

Table 22: Loglinear regression of TRAC scales[6] on Final Course Grades

Scale:	Coefficient	Standard Error	Ratio of Coeff/Std.Err.	Likelihood ratio	Prob.
Exam Anxiety	0.8002	0.2508	3.19*	2.2022	0.532
Failure Anxiety	-1.3113	0.3193	4.11	9.2009	0.027
Test Preparations	0.7468	0.2419	3.09*	0.5888	0.899
In-Class Attention	1.0759	0.2845	3.78*	01.1823	0.757
Seeking Professor's Help	0.7557	0.2400	3.15*	0.2517	0.969
Peer Learning	0.2079	0.2047	1.02	4.7558	0.191
Attitudes towards Study Skills and Work Habits	0.2297	0.1082	2.12	13.6813	0.003
Effort Regulation	0.0482	0.1963	0.25	1.0000	0.777
Importance of Cégep Studies	0.5007	0.2252	2.22*	0.6803	0.878

* Significant

The final issue addresses these scales as independent variables and final course grades, as dependent measures in multiple regression analysis. The forward selection method allows us to see which *order* of scale scores most contributes to predicting final course grades. The cutoff for inclusion ("PIn") and exclusion ("POut) are 0.05 and 0.10. This means that while each scale can contribute *something* to the regression equation only those which have *important* (i.e. "statistically significant") contributions are retained. The results of the multiple regression analysis appear below. We used the scales shown to have validity and

[6]The TRAC scales were trichotomized according to criteria set in Table 116. That is Group 1 (lower quartile), Group 2 (middle 50%), and Group 3 (upper quartile).

reliability, important interactions with the final course grades, and which fit a linear model of prediciton as independent measures. The dependent measure was, of course, final course grade. Table 23 reveals that only the first three scales survived the rigors of this analysis. These scales are, in order of importance (see partial correlation coefficients and Significance of F also in Table 23), "test strategies and preparation -0.0005 (LASSI)" followed, ex aequo, by "self-efficacy for learning -0.0073" and "test anxiety -0.0073 (both MSLQ)".

Table 23: Results of multiple regression of selected scales on the MSLQ, LASSI and TRAC on final course grades.

Variable:	F value	Significance of F
Self-efficacy for learning and performance (MSLQ)	7.612	0.0073
Test strategies and preparations (LASSI)	13.430	0.0005
Test anxiety (MSLQ)	7.602	0.0073
Self-regulation	0.351	0.5554
Time and study management principles (MSLQ)	0.838	0.3628
Effort regulation	0.788	0.3776
Time and study (LASSI)	0.045	0.8325
Anxiety (LASSI)	0.875	0.3525
Concentration (LASSI)	0.203	0.6537
Selecting Main Ideas(LASSI)	0.965	0.3292
Self-testing(LASSI)	0.007	0.9316
Fear of failure(TRAC)	0.020	0.8882
Test preparations(TRAC)	0.917	0.3414
Attention in class(TRAC)	0.704	0.4043
Seeking out the help of the professor(TRAC)	1.007	0.3189
Importance of Cégep studies to student(TRAC)	0.191	0.6633

Thus, it appears that pre-validation suggests that test-preparation, anxiety and self-efficacy are uppermost in students' minds and needs for course performance. Whether these are reflections that may be generalized to other courses and types of students needs to be validated on the full cohort of entering first-year students.

"Test preparation" or "test strategies" and "self-efficacy for learning and performance" were described this way to students when they received feedback about their scores on these scales:

Test Strategies: Doing well on tests is dependent on test preparation and test review. What type of test is to be expected? Will recognition or recall of information be necessary? How much will we have? What material will we be expected to have acquired? If you find that you study the same way for all tests you need to talk to someone. Successful students will tell you that you don't study for an essay test as you would for a multiple-choice test! The Social Science Department Handbook contains valuable information about this topic. (Adapted from the original MSLQ feedback form.)

Closely related to the concept of "controlling" your learning are the concepts of **self-efficacy for learning and performance** which is an appraisal of one's ability to master a task. Self-efficacy includes judgments about one's ability to accomplish a task as well as one's confidence in one's skills to perform that task. (Adapted from the original MSLQ feedback form.)

Additionally, the students received this information about what it meant to have a "strategy" to develop self-efficacy for learning and performance:

Suggestions: Evaluate your current approach to a course assignment from different points of view. For example, describe the effectiveness and ineffectiveness of your own approach from your own perspective. Then imagine how a classmate might evaluate your approach. By analyzing the way you are tackling an assignment, you may be able to figure out what you're doing right and what you're doing wrong. Then you can work to change your approach. A better understanding of the way you learn, what works and what doesn't work, may help increase your confidence in doing well in the course. (Adapted from the original MSLQ feedback form.)

As for "anxiety", students were told:

Test anxiety is a measure of how much you worry about tests and how often you have distracting thoughts when you take an exam. In contrast to the other scales, a high score here means that you are anxious in testing situations. (Adapted from the original MSLQ feedback form and the LASSI User's Manual.)

And, they were given these "cognitive re-structuring" suggestions:

> Suggestions: Developing better study skills usually results in less anxiety. Prepare well for class and try to complete assignments on time. Try not to wait until the last minute to get things done or to get ready for an exam. Doing this should help build your confidence at test time and hopefully reduce test anxiety. When taking a test, concentrate on one item at a time, and if you're blocked on a question, move on and go back to the question later. Remind yourself that you've prepared well and if you can't answer some questions, it's okay, you'll still be able to answer the others. (Adapted from the original MSLQ feedback form and the LASSI User's Manual.)

These suggestions appear to be useful for academic advising. It may very well turn out that each discipline may call upon different arrays of study skills and learning strategies. There is much evidence in the literature (Pintrich and Johnson, 1990; Borkowski and Muthukrishna, 1992) to support this claim. Weinstein, Goetz and Alexander (1988) have collated excellent materials in Learning and Study Strategies: Issues in Assessment, Instruction and Evaluation. Since the focus of psychology courses on this campus is to get students to read and to increase their reading comprehension, the article by Schallert, Alexander and Goetz dealing with "Implicit instruction of strategies for learning from text" has proven itself to be realistic and useful.

If teachers can manage to help students develop and/or acquire more useful learning strategies then, to that same degree, students will be working 'smarter' rather than working 'harder' (Weinstein, Hagen and Meyer, 1991).

Chapter 5: Conclusions

This pre-validation study purports to establish that the Motivated Strategies for Learning Questionnaire ("MSLQ"), the Learning And Study Skills Inventory ("LASSI"), and the Test of Reactions and Adaptation to College ("TRAC") can contribute significant information to teachers about how to help students help themselves.

The academic advising effort, at least in psychology courses, should continue to be directed at "test preparation", "self-efficacy for learning and performance" and "anxiety". Statistical analyses based on final course grades in psychology for the three instruments reveal that these variables are reported to have excellent regression effects on final (psychology) course grades.

Anxiety, apparently "exam" anxiety, is a variable common to all students. Loglinear analyses suggest that at-risk students (65% or less in the course) have problems with "concentration /or attention in class", "meaningful and timely effort", and to a lesser, but still very important, degree "time and study management principles" along with "making use of the professor as a resource". We propose to field test several new ways of actively involving students in psychology classes through demonstrations, discussions etc. and keeping lectures to a minimum.

The MSLQ, LASSI and TRAC clearly show our students to be preoccupied with anxiety. The TRAC, which specifically delimits exam anxiety from failure anxiety, suggests that exam anxiety, more than failure anxiety, is at issue here. This interpretation is *suggested* from the fact that the model ("prob.=0.027" in Table 22) is an extremely poor fit with observed data. It could be that the inadequacy of the model or the sample are also responsible for this situation. We are not ready at this time to specify which types of anxiety are operative -only that high levels of anxiety are present. Future work should address the issue with specific questions formulated to delimit differences in realistic anxiety (fearing the consequences for not having done one's preparatory work) from learning, performance, or evaluation anxiety.

The aim of this document was to help teachers understand why and how they can help -the "what to do"- students, especially those likely to be "at risk". The

theoretical work on "motivated cognitions" by Covington is used to explain "why" students haven't been receptive, in the past, to academic advising efforts. The work from the field of developmental education is used to show how such knowledge can influence students to participate in learning to learn. It is argued that teachers stand to gain in their efforts to do developmental education in that teacher and students move beyond student bickering about grades, unprepared office visits, incomplete assignments, lack of attention in class etc.

A follow up study on this initial effort is in order. We could use a full cohort of entering students, sample their study skills and learning strategies behavior in each discipline, at the beginning, at midterm, and then again at the end of the term. The study of the linear structural relationships between grades and scores at these three points in time would help us to assess the interactions between academic advising, student study skills and learning strategies, and student grades. Although the TRAC is the single-best instrument for this purpose, or a composite of three scales from the MSLQ (self efficacy for learning and performance; and, test anxiety), and LASSI (test strategies and preparation), appear promising, we strongly recommend using all three instruments and possibly adding a few scales to assess the nature of anxiety.

Interested teachers have been invited to make use of the instruments, and support materials and services, to help contribute to their own academic advising efforts. Perhaps if enough of the teachers participate we could envisage including results in the Departmental Student Handbook.

Our concern has been to help teachers understand student performances, or non-performances, when students have ability and resources, and to suggest ways these same teachers can act in their academic advising roles.

References

Bateman,D. (1987) **A Longitudinal Study of the Cognitive and Affective Growth of Cégep Students - An Interim Report**, Champlain Regional College, St-Lambert-Longueuil Campus, St-Lambert (Québec) J4P 3P2.

Bateman,D. (1989) **A Longitudinal Study of the Cognitive and Affective Growth of Cégep Students** Champlain Regional College, St-Lambert-Longueuil Campus, St-Lamber (Québec) J4P 3P2.

Bogue,C. (1988) **Transferable study skills can taught.** Clearwater, Florida: H&H Publishing Co.,Inc.

Borkowski,J.G. and Muthukrishna,N. (1992) "Moving Metacognition into the Classroom: 'Working Models' and Effective Strategy Teaching." In **Promoting Academic Competence and Literacy in Schools**. N.Y.: Academic Press, Chpt.17, pp 477-501.

Covington,M.V. (1983) "Motivated Cognitions". In S.G.Paris,G.M.Olson, and H.W. Stevenson (editors) **Learning and Motivation in the Classroom**. Hillsdale:New Jersey. Lawrence Erlbaum Associates.

Covington,M.V. and C.L. Omelich (1979a) "Effort: The Double-Edged Sword in School Achievement" **Journal of Educational Psychology** 71(2), 169-182.

Covington,M.V. and C.L. Omelich (1979b) "It's Best to be Able and Virtuous Too: Student and Teacher Evaluative Responses to Successful Effort" **Journal of Educational Psychology** 71(5), 688-700.

Covington,M.V. and C.L. Omelich (1981) "As Failures Mount: Affective and Cognitive Consequences of Ability Demotion in the Classroom" **Journal of Educational Psychology** 73(6), 796-808.

Covington,M.V. and C.L. Omelich (1984) "Task-Oriented Versus Competitive Learning Structures: Motivational and Performance Consequences" **Journal of Educational Psychology** 76(6), 1038-1050.

Covington,M.V. and C.L. Omelich (1985) "Ability and Effort Valuation Among Failure-Avoiding and Failure Accepting Students" **Journal of Educational Psychology** 77(4), 446-459.

Cross,K.P. and T.A.Angelo (1988) **Classroom Assessment Techniques - A Handbook for Faculty** National Center for Research to Improve Postsecondary Teaching and Learning (NCRIPTAL) The University of Michigan, Ann Arbor, Michigan.

Falardeau,I., S. Larose. and R. Roy (1988) **Test of Reactions and Adaptations to College**, Cégep de Ste-Foy, Ste-Foy, P.Q., Canada.

Festinger,L. and J.M.Carlsmith (1959) "Cognitive consequences of forced compliance." **Journal of Abnormal and Social Psychology** 58, 203-210.

Fleet,J., F. Goodchild, and R. Zajchowski (1990) **Learning for Success: Skills and Strategies for Canadian Students** Toronto;Harcourt,Brace and Jovanovich.

Fraenkel,J.R. and N.E. Wallen (1990) **How to Design and Evaluate Research in Education** Montréal: McGraw-Hill.

Geoffrion,S. (1993) Get Smart Fast: A Handbook for Academic Success. Saratoga,Calif.: R & E Publishers.

Johnson,G.R., J.A. Eison, R.Abbott, G.T. Meiss, K.Moran, J.A. Gorgan, T.L. Pasternack, E. Zaremba and W.J. McKeachie (1991) **Teaching Tips for Users of the Motivated Strategies for Learning Questionnaire** National Center for Research to Improve Postsecondary Teaching and Learning (NCRIPTAL). The University of Michigan, Ann Arbor, Michigan.

Larose,S., R. Roy and I.Falardeau (1991) **Test de Réactions et d'Adaptation au Collégial**, Cégep de Ste-Foy, Ste-Foy, P.Québec, Canada.

Maehr,M.L. "On Doing Well in Science: Why Johnny No Longer Excels; Why Sarah Never Did." In S.G.Paris,G.M.Olson, and H.W. Stevenson (editors) **Learning and Motivation in the Classroom**. Hillsdale:New Jersey. Lawrence Erlbaum Associates.

McKeachie,W., P.R. Pintrich & Y.-G. Lin (1985) Teaching Learning Strategies. **Educational Psychologist** Summer, 20(3), 153-160.

Nicholls,J.G. (1983) "Conceptions of Ability and Achievement Motivation: A Theory and Its Implications for Education." In S.G.Paris,G.M.Olson, and H.W. Stevenson (editors) **Learning and Motivation in the Classroom**. Hillsdale:New Jersey. Lawrence Erlbaum Associates.

Nicholls,J.G. (1984) "Conceptions of Ability and Achievement Motivation." In Russell and Carole Ames (Eds.) **Research on Motivation in Education - Student Motivation**, Vol.1, Toronto: Academic Press.

Norusis,M.J. (1990) "Reliability Analysis" **SPSS/PC+** ***Statistics*** v.4.0 Chicago, Illinois: SPSS, Inc.

Norusis,M.J. (1990) **SPSS/PC+** ***Advanced Statistics*** v.4.0 Chicago, Illinois: SPSS, Inc.

Pintrich,P.R. and G.R. Johnson (1990) "Assessing and Improving Students' Learning Strategies." In M.D. Svinicki (Ed.) The Changing Face of College Teaching, **New Directions for Teaching and Learning**, No.42, Summer; San Francisco: Jossey-Bass, 83-92.

Pintrich,P.R., D.A.F. Smith,, T. Garcia and W.J. McKeachie (1991) **A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ)** The National Center for Research to Improve Postsecondary Teaching and Learning (NCRIPTAL) and the School of Education at The University of Michigan, Ann Arbor, Michigan.

Québec (1993) **La réussite scolaire lors du premier trimestre d'études collégiales de 1980 à 1989**. Ministère de l'Enseignement supérieur et de la Science, Direction générale de l'enseignment collégial, Direction de la recherche et du développement, septembre.

Shrieves,L. "Math phobia plus special classes often equals less anxiety," **The Boston Sunday Globe**, October 3.

Talbot,G.L. (1993) **Self-Regulated Achievement in the Cégep Student: Motivated strategies for learning.** Champlain Regional College, Saint-Lawrence Campus, Sainte-Foy, P.Québec, Canada G1V 4K2. Available from ERIC under the # ED 360 269. Abstracted in RIE, Dec., 1993.

Thomas,E.L and H.A. Robinson (1982) **Improving Reading in Every Classroom: A sourcebook for teachers** 3rd ed., Boston: Allyn & Bacon.

Valian,V. (1977) "Learning to Work". In S.Ruddick and P.Daniels **Working It Out** New York: Pantheon Books.

Weiner,B. (1983) "Some Thoughts About Feelings." In S.G.Paris,G.M.Olson, and H.W. Stevenson (editors) **Learning and Motivation in the Classroom**. Hillsdale:New Jersey. Lawrence Erlbaum Associates.

Weinstein,C.E. (1987) **LASSI User's Manual** Clearwater,Florida: H&H Publishing Co.,Inc. 1231 Kapp Drive. There are no page numbers used in this manual. We have used the convention to report pages beginning with the Table of Contents, numbered "page 1", to the last page, numbered 18.

Weinstein,C.E. (1988)"Learning to learn strategies: Learning what you know, learning what you do not know, and learning what do about it," Suanne D. Roueche (Ed.) **Innovation Abstracts** Vol. X, No.11, April (ISSN 0199-106X)

Weinstein,C.E. (1992) personal correspondence.

Weinstein,C.E. (1993) Draft of a paper "Developmental Education: Learning to Learn Classes" available from the author at University of Texas at Austin.

Weinstein,C.E., E.T.Goetz, and P.A. Alexander (1988) **Learning and Study Strategies: Issues in Assessment, Instruction and Evaluation**. Toronto: Academic Press.

Weinstein,C.E., A.S.Hagen and D.K. Meyer (1991) "Work Smart ...Not Hard: The Effects of Combining Instruction in Using Strategies, Goal Using, and Executive Control on Attributions and Academic Performance." In H.H. Marshall (Chairperson) I can't because I don't know how: Links among and beyong attribution, strategy, and attribution to strategy, Symposium conducted at the

meeting of the American Educational Research Association (AERA), Chicago, Illinois, April.

Weinstein,C.E. and R.E. Mayer (1986) "The Teaching of Learning Strategies". In M.C. Wittrock (Ed.) **Handbook of Research on Teaching** 3rd ed., N.Y.: Macmillan.

Weinstein,C.E., D.R. Palmer, and A.C. Schulte **LASSI: Learning And Study Strategies Inventory**. Clearwater,Florida: H&H Publishing Co.,Inc. 1231 Kapp Drive.